This document gives pertinent information concerning the issuance of the VPDES Permit listed below. This permit is being processed as a major, municipal permit. The discharge results from the operation of a 7.5 MGD wastewater treatment plant and includes a proposed future expansion to 10 MGD. This facility is located within the Commonwealth of Virginia but discharges to Maryland waters. As such, the effluent limitations and special conditions contained within this permit will maintain the Water Quality Standards of both Maryland (COMAR 26.08.02 et seq.) and Virginia (9 VAC 25-260-00 et seq.).

1.	Facility Name and Mailing Address:	Leesburg WPCF 25 West Market Street P.O. Box 88 Leesburg, VA 20178	SIC Code:	4952 WWTP
	Facility Location:	1391 East Market Street Leesburg, VA 20176	County:	Loudoun
	Facility Contact Name:	Steve W. Cawthron Utility Plant Manager	Telephone Number:	703-737-7091
2.	Permit No.:	VA0092282	Current Expiration Date:	Not Applicable
	Other VPDES Permits:	VAR051427 – Stormwater General Permit VAN010061 – General Watershed Permit for Total Nitrogen and Total Phosphorus Discharges		
	Other Permits:	Registration Number 72260 – DEQ Air Permit VAR104346 (Stormwater Construction) – Virginia Department of Conservation & Recreation VDACS Specialty Fertilizer License Number 59-44800-107 MD0066184 (Maryland discharge permit) – expires 30 April 2009		
	E2/E3/E4 Status:	Environmental Enterprise (E2) Member		
3.	Owner Name:	Town of Leesburg		
	Owner Contact/Title:	Randolph W. Shoemaker Director of Utilities	Telephone Number:	703-771-2755
4.	Application Complete Date:	6 February 2008		
	Permit Drafted By:	Douglas Frasier	Date Drafted:	28 May 2008
	Draft Permit Reviewed By:	Alison Thompson	Date Reviewed:	17 June 2008
	Public Comment Period:	Start Date: 28 August 2008	End Date:	26 September 2008
5.	Receiving Waters Information:	See **Attachment 1** for the Flow Frequency Determination		
	Receiving Stream Name:	Potomac River		
	Drainage Area at Outfall:	10,721 square miles	River Mile:	149.75
	Stream Basin:	Potomac River	Subbasin:	Potomac River
	Section:	02 – Washington Metropolitan Area	Steam Class:	II
	Special Standards:	MDE – Use IP	Waterbody ID:	MDE Basin (02-14-02-02)
	7Q10 Low Flow:	627 MGD	7Q10 High Flow:	67,385 MGD
	1Q10 Low Flow:	547 MGD	1Q10 High Flow:	137,022 MGD
	Harmonic Mean Flow:	Not Available	30Q5 Flow:	27,064 MGD
	303(d) Listed:	Yes	30Q10 Flow:	741 MGD
	TMDL Approved:	Tidal portions of the Potomac River	Date TMDL Approved:	31 October 2007

6. Statutory or Regulatory Basis for Special Conditions and Effluent Limitations:

✓	State Water Control Law		EPA Guidelines
✓	Clean Water Act	✓	Water Quality Standards (MD and VA)
✓	VPDES Permit Regulation	✓	Other: Dulles Policy
✓	EPA NPDES Regulation		

7. Licensed Operator Requirements: Class I

8. Reliability Class: Class I

9. Permit Characterization:

___ Private	✓ Effluent Limited	✓ Possible Interstate Effect
___ Federal	✓ Water Quality Limited	___ Compliance Schedule Required
___ State	✓ Toxics Monitoring Program Required	___ Interim Limits in Permit
✓ POTW	✓ Pretreatment Program Required	___ Interim Limits in Other Document
___ TMDL		

10. Wastewater Sources and Treatment Description:

The Leesburg Water Pollution Control Facility serves a population of approximately 37,500. The sources consist of domestic, restaurants and light commercial.

Preliminary Treatment

As the influent enters the plant, sodium hypochlorite can be added for odor control during the warmer periods of the year. The plant has two (2) mechanical barscreens, positioned in parallel channels. The flow then enters a wetwell which is then pumped to two (2) vortex grit chambers for removal of heavy grit. The screenings from the barscreen and the settled grit are washed, dewatered and collected in dumpsters for disposal at the landfill.

Primary Treatment

The screened and degritted wastewater flows by gravity to the primary clarifiers after passing through a splitter box. At this point in the operation, flows exceeding 12.5 MGD are diverted to either the emergency storage basins (two at 1.25 million gallons each) or the emergency storage tank (one at 1.6 million gallons). The facility has the ability to add Ferric chloride and polymer prior to the primary clarifiers to enhance phosphorus removal. Primary sludge is routed to the gravity thickeners.

The primary effluent enters a splitter box prior to the bioreactors. Sodium hydroxide is added for alkalinity control. The facility does have the capability of methanol addition as a carbon source; however, this option has not been exercised and there is no methanol stored on site for inherent safety concerns. Other carbon sources are being investigated for future Enhanced Nutrient Removal (ENR) capabilities.

Secondary Treatment

Biological Nutrient Removal (BNR) is accomplished via bioreactors, each consisting of four (4) zones of treatment; anoxic for denitrification, 2 swing zones and an aerobic zone for nitrification. Mixed liquor from the effluent is recycled to the influent of the bioreactor to further reduce nitrate levels. Bioreactor effluent flows to the secondary clarifiers. Ferric chloride and polymer are added prior to the clarifiers as needed for phosphorus removal enhancement. Return Activated Sludge (RAS) is sent to the reactor basins. Wasted Activated Sludge (WAS) is sent to the sludge handling building for further treatment.

Advanced Secondary Treatment

This portion of the treatment plant utilizes two (2) gravity sand filters to reduce the Total Suspended Solids (TSS) content of the effluent. Sodium hypochlorite, polymer and sodium hydroxide are added as needed to prevent biological growth/disinfection, enhance capture of settleable solids and to clean the filter media, respectively. The sand filters are periodically backwashed as required with the backwash routed to the raw sewage pump station.

Disinfection

Sodium hypochlorite addition occurs at the sand filters for disinfection and biological growth control. Effluent is then pumped to the receiving stream via 3.5 miles of effluent pipe. The effluent is dechlorinated with sodium bisulfite and reaerated prior to discharge to the Potomac River.

See **Attachment 2** for a facility schematic/diagram.

TABLE 1
OUTFALL DESCRIPTION

Outfall Number	Discharge Sources	Treatment	Design Flow	Outfall Latitude and Longitude
001	Domestic Wastewater	See Item 10 above.	7.5 MGD	**39° 06' 54" N** **77° 30' 15" W**

See **Attachment 3** for the topographic map.

11. Sludge Treatment and Disposal Methods:

Sludge treatment consists of gravity thickeners, anaerobic digestion, centrifuges, dewatering via belt press and then thermally dried. The biosolids product is a Class-A, pathogen free, granular product. The facility possesses a Specialty Fertilizer License issued by the Virginia Department of Agriculture and Consumers Services (VDACS), permitting the distribution of the product as a soil amendment to individuals. See **Attachment 4** for product information.

The facility has the option of either land application via commercial truck spreaders or distribution to individuals in 25 or 50 pound bags. The annual amount generated is 913.66 dry metric tons according to the permit application. Of this amount, 117 dry metric tons was sold or given away via the 25/50 pound bags.

The facility also receives sewage sludge form the Kenneth B. Rollins Water Treatment Plant (approximately 310 dry metric tons) and septage from the Town's sewer line cleaning for final treatment and disposal.

12. Discharges, Intakes, Monitoring Stations & Other Items in the Vicinity of the Discharge:

TABLE 2
DISCHARGES, INTAKES & MONITORING STATIONS

ID / Permit Number	Description	Latitude / Longitude
Station 01638500	USGS Gaging Station – Point of Rocks, MD	39° 16' 24.9" / 77° 32' 35.2"
PWSID 6107300	Town of Leesburg Water Treatment Plant – intake	39° 06' 56.1" / 77° 30' 18.4"
PWSID 6059501	FCWA – J.J. Corbalis Water Treatment Plant – intake	39° 03' 46.2" / 77° 20' 35.9"
VA0024121	The Madeira School WWTP – municipal discharge	38° 58' 26.0" / 77° 14' 10.0"
Station 01646500	USGS Gaging Station – Little Falls Pump Station	38° 56' 59.2" / 77° 07' 39.5"

13. Material Storage:

TABLE 3
MATERIAL STORAGE

Materials Description	Volume Stored	Spill / Stormwater Prevention Measures
Ferric Chloride	2 tanks 5,000 gallons each	Stored outside the Chemical Storage Building within a shared containment unit. The structure is equipped with a manually operated drain valve that is connected to the plant's drain system. SPCC in place.
Sodium Hydroxide	2 tanks 5,000 gallons each	Stored under roof inside the Chemical Storage Building and within a containment unit equipped with a manually operated drain valve that is connected to the plant's drain system. SPCC in place.
Sodium Hypochlorite	2 tanks 5,000 gallons each	Stored outside the Chemical Storage Building within a shared containment unit. The structure is equipped with a manually operated drain valve that is connected to the plant's drain system. SPCC in place.
Sodium Bisulfite	1 tank 5,000 gallons	Located inside the dechlorination building within a containment structure. The containment structure drains to the building sump which must be periodically pumped out. SPCC in place
Cationic Polymer	3 units 2200 lbs. each	Stored inside the solids handling facility. IBC Totes (steel cage/polyethylene container), stored in a location that will allow any spills to be routed back to the headworks. SPCC in place.
Methanol	2 tanks 3,000 gallons each	Stored outside within a containment unit next to the methanol pump building. The structure is equipped with a drain sump and manually operated drain valve that is connected to the plant's drain system. **Currently there is no methanol stored on site**.
Liquid Nitrogen	2,000 gallon vessel	Located outside of the solids handling building. SPCC in place.
Diesel Fuel	10,000 gallon tank	Located next to the emergency generator. Double-walled with a catch basin located at truck off loading area. SPCC in place.
Small quantities of acids	Sixteen 1-gallon containers	Stored on spill containment platform. SPCC in place.

14. Site Inspection: Performed by NRO staff on 3 April 2008 (see **Attachment 5**).

15. Receiving Stream Water Quality and Water Quality Standards:

a). Ambient Water Quality Data

The State of Maryland has two ambient monitoring stations on the Potomac River; providing data both upstream and downstream of the Outfall. Shepherdstown (POT1830), at the Route 34 Bridge, is located approximately 39.4 rivermiles upstream and Little Falls (POT1184) is located north of Washington D.C., approximately 31.4 rivermiles downstream.

The Draft 2008 Integrated Report of Surface Water Quality in Maryland lists four (4) impairments for this section of the Potomac River:

Use	Impairment	Year Listed
Fishing	PCBs in Fish Tissue	2008
Aquatic Life / Wildlife	Total Suspended Solids (TSS)	1996
	Combination Benthic / Fishes Bioassessment	2006
	Phosphorus (Total)	1996

There is no approved TMDL for this section of the Potomac River. However, the EPA approved the Polychlorinated Biphenyls (PCBs) TMDL for the tidal portions of the Potomac and Anacostia Rivers on 31 October 2007.

In addition, significant portions of the Chesapeake Bay and its tributaries are listed as impaired on Virginia's 303(d) list of impaired waters for not meeting the aquatic life use support goal, and the 2006 Virginia Water Quality Assessment 305(b)/303(d) Integrated Report indicates that much of the mainstem Bay does not fully support this use support goal under Virginia's Water Quality Assessment guidelines. Nutrient enrichment is cited as one of the primary causes of impairment.

In response, the Virginia General Assembly amended the State Water Control Law in 2005 to include the *Chesapeake Bay Watershed Nutrient Credit Exchange Program.* This statute set forth total nitrogen and total phosphorus discharge restrictions within the bay watershed. Concurrently, the State Water Control Board adopted new water quality criteria for the Chesapeake Bay and its tidal tributaries. These actions necessitate the evaluation and the inclusion of nitrogen and phosphorus limits on discharges within the bay watershed.

b). Receiving Stream Water Quality Criteria

The mainstem of the Potomac River is Maryland waters. Outfall 001 discharges at a point 30 feet east of the Maryland political boundary; thus, the discharge has the potential to affect Maryland waters. Title 26, Subtitle 08 of the Code of Maryland Regulations (Maryland Water Quality Standards) has been reviewed and the proposed limitations contained within should comply with these regulations (**Attachment 6**).

The receiving stream, per the Maryland Water Quality Criteria, has been designated as Use IP water. The use goals include water contact recreation, protection of nontidal warmwater aquatic life and public water supply. The dissolved oxygen (D.O.) may not be less than 5.0 mg/L at any time and maintain a pH of 6.5 – 8.5 standard units (S.U.).

Attachment 7 details the Virginia Water Quality Standards (9 VAC 25-260).

Ammonia:

MDE's Water Quality Criteria for Ammonia are dependent on instream temperature and pH. Ambient water quality data were available from the Little Falls Monitoring Station (POT1184) and the Shepherdstown Monitoring Station (POT1830). Data summaries for temperature, dissolved oxygen and pH are presented in **Attachment 8**. Since both stations presented data that was not statistically different, staff utilized data from the Little Falls station to determine the ammonia criteria.

Metals Criteria:

The Water Quality Criteria for some metals are dependent on the receiving stream's hardness (expressed as mg/L calcium carbonate). The average hardness of the receiving stream, upstream of the discharge point, is 137 mg/L according to samples collected at the USGS monitoring station at Rock of Points Maryland (Station Number 1638500). The average hardness of the discharge is 160 mg/L as $CaCO_3$. See **Attachment 9** for ambient and effluent hardness data summaries.

Bacteria Criteria:

The Virginia Water Quality Standards (9 VAC 25-260-170 B.) states sewage discharges shall be disinfected to achieve the following criteria:

E. coli bacteria per 100 mL of water shall not exceed the following:

	Geometric Mean[1]	Single Sample Maximum
Freshwater *E. coli* (N/100 mL)	126	235

[1]For two or more samples taken during any calendar month.

The Maryland Water Quality Criteria Specific to Designated Uses (Code of Maryland Regulations 26.08.02.03-3.A) states that sewage discharges shall be disinfected to achieve the following criteria:

E. coli and enterococci bacteria per 100 mL of water for all areas shall be as follows:

	Geometric Mean[1]	Single Sample Maximum
Freshwater *E. coli* (N/100 mL)	126	235
Freshwater enterococci	33	61

[1]For two or more samples taken during any calendar month.

c). Receiving Stream Special Standards

Chapter 9 VAC 25-401-10 et seq. of the State Water Control Law was established to regulate the discharge from sewage treatment plants within the Dulles Area Watershed, which is located upstream of several major public water supply intakes serving the Washington, D.C. metropolitan area. This Policy prescribes specific effluent limitations for sewage treatment works discharging within this watershed in order to protect vital public water supply intakes. However, this regulation does not restrict or affect sewage treatment plants located in the Dulles Area Watershed that do not discharge to surface waters within the boundaries of this watershed.

The Town of Leesburg WPCF is sited within the boundaries of the watershed; however, the discharge point is located at the Potomac River; outside the Dulles Area Watershed. Therefore, this Policy and the respective effluent limitations are not applicable to the Leesburg Water Pollution Control Facility.

d). Threatened or Endangered Species

The Virginia DGIF Fish and Wildlife Information System Database was searched for records to determine if there are threatened or endangered species in the vicinity of the discharge. The following threatened or endangered species were identified within a 2 mile radius of the discharge: the Wood Turtle, Upland Sandpiper, Loggerhead Shrike (song bird), Henslow's Sparrow, Bald Eagle, Green Floater (mollusks) and the Loggerhead Migrant Shrike (song bird). The limits proposed within this draft permit are protective of both the Maryland and Virginia Water Quality Standards; therefore, protecting the threatened and endangered species found near the discharge.

16. Antidegradation (9 VAC 25-260-30):

All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The receiving stream has been classified as Tier 1 based on the fact that the Potomac River has been listed as impaired due to nutrient enrichment. Permit limits proposed have been established by determining wasteload allocations which will result in attaining and/or maintaining all water quality criteria which apply to the receiving stream, including narrative criteria. These wasteload allocations will provide for the protection and maintenance of all existing uses.

17. Effluent Screening, Wasteload Allocation and Effluent Limitation Development:

To determine water quality-based effluent limitations for a discharge, the suitability of data must first be determined. Data is suitable for analysis if one or more representative data points are equal to or above the quantification level ("QL") and the data represent the exact pollutant being evaluated.

Next, the appropriate Water Quality Standards are determined for the pollutants in the effluent. Then, the Wasteload Allocations (WLAs) are calculated. The WLA values are then compared with available effluent data to determine the need for effluent limitations. Effluent limitations are needed if the 97th percentile of the daily effluent concentration values is greater than the acute wasteload allocation or if the 97th percentile of the four-day average effluent concentration values is greater than the chronic wasteload allocation. Effluent limitations are the calculated on the most limiting WLA, the required sampling frequency, and statistical characteristics of the effluent data.

a). Effluent Screening

Effluent summary data obtained from Discharge Monitoring Reports (DMRs) for the year 2007 has been reviewed and determined to be suitable for evaluation. Please see **Attachment 10** for monthly effluent data report summaries for 2007.

b). Mixing Zones and Wasteload Allocations (WLAs)

Wasteload allocations (WLAs) are calculated for those parameters in the effluent with the reasonable potential to cause an exceedance of water quality criteria. The basic calculation for establishing a WLA is the steady state complete mix equation:

$$WLA = \frac{C_o [Q_e + (f) (Q_s)] - [(C_s) (f) (Q_s)]}{Q_e}$$

Where:
- WLA = Wasteload allocation
- C_o = In-stream water quality criteria
- Q_e = Design flow
- f = Decimal fraction of critical flow from mixing evaluation
- Q_s = Critical receiving stream flow (1Q10 for acute aquatic life criteria; 7Q10 for chronic aquatic life criteria; harmonic mean for carcinogen-human health criteria; 30Q10 for ammonia criteria; and 30Q5 for non-carcinogen human health criteria)
- C_s = Mean background concentration of parameter in the receiving stream.

The Water Quality Standards contain two distinct mixing zone requirements. The first requirement is general in nature and requires the "use of mixing zone concepts in evaluating permit limits for acute and chronic standards in 9 VAC 25-260-140.B". The second requirement is specific and establishes special restrictions for regulatory mixing zones "established by the Board".

The Department of Environmental Quality uses a simplified mixing model to estimate the amount of mixing of a discharge with the receiving stream within specified acute and chronic exposure periods. The simplified model contains the following assumptions and approximations:

- The effluent enters the stream from the bank, either via a pipe, channel or ditch.
- The effluent velocity isn't significantly greater (no more than 1 - 2 ft/sec greater) than the stream velocity.
- The receiving stream is much wider than its depth (width at least ten times the depth).
- Diffusive mixing in the longitudinal direction (lengthwise) is insignificant compared with advective transport (flow).
- Complete vertical mixing occurs instantaneously at the discharge point. This is assumed since the stream depth is much smaller than the stream width.
- Lateral mixing (across the width) is a linear function of distance downstream.
- The effluent is neutrally buoyant (e.g. the effluent discharge temperature and salinity are not significantly different from the stream's ambient temperature and salinity).
- Complete mix is determined as the point downstream where the variation in concentration is 20% or less across the width and depth of the stream.
- The velocity of passing and drifting organisms is assumed equal to the stream velocity.

As stated above, the model assumes that the discharge enters the receiving stream at the shoreline; however, the discharge point for this facility is actually submerged, extending approximately 30 feet from the stream bank into the Potomac River. It was staff's best professional judgement that the mixing model would suffice in this situation even though the first assumption was not satisfied. In this scenario, the model's output would provide conservative estimates in which to base effluent limitations and would protect the use designations for the receiving waters.

If it is suitably demonstrated that a reasonable potential for lethality or chronic impacts within the physical mixing area doesn't exist, then the basic complete mix equation, with 100% of the applicable stream flow, is appropriate. If the mixing analysis determines there is a potential for lethality or chronic impacts within the physical mixing area, then the proportion of stream flow that has mixed with the effluent over the allowed exposure time is used in the basic complete mix equation. As such, the wasteload allocation equation is modified to account for the decimal fraction of critical flow (f).

Staff derived wasteload allocations where parameters are reasonably expected to be present in an effluent (e.g., total residual chlorine where chlorine is used as a means of disinfection) and where effluent data indicate the pollutant is present in the discharge above quantifiable levels. With regard to the Outfall 001 discharge, ammonia as N is likely present since this is a WWTP treating sewage, total residual chlorine may be present since chlorine is used for disinfection and Form 2A data indicated that Copper, Nickel and Zinc are present in the discharge. As such, **Attachment 11** details the mixing analysis results and **Attachment 12** presents the WLA derivations for the 7.5 MGD and 10 MGD facilities, respectively.

c). Effluent Limitations Toxic Pollutants, Outfall 001

9 VAC 25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Those parameters with WLAs that are near effluent concentrations are evaluated for limits.

The VPDES Permit Regulation at 9 VAC 25-31-230.D. requires that monthly and weekly average limitations be imposed for continuous discharges from POTWs and monthly average and daily maximum limitations be imposed for all other continuous non-POTW discharges.

1) Ammonia as N/TKN:

The Leesburg facility has a monthly average ammonia limitation of 3 mg/L under the current Maryland permit. Submitted 2007 monthly effluent summaries indicated the facility was able to maintain a monthly average ammonia level of 0.8 mg/L and 1.3 mg/L for Total Kjeldahl Nitrogen (TKN).

Based on (1) the facility's 2007 ammonia data, (2) the 2007 TKN data and (3) the facility's nutrient monitoring and reporting requirements under the *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia*, it is staff's best professional judgement that the facility be given a year round TKN limit of 3.0 mg/L in lieu of the current ammonia limit.

A TKN limit of 3.0 mg/L assumes that the remaining nitrogen is in the form of refractory organic compounds that will not be easily oxidized and that ammonia is removed when the 3.0 mg/L TKN limit is met. The weekly average limit will be 4.5 mg/L based on a multiplier of 1.5 times the monthly average.

2) Total Residual Chlorine:

The facility utilized UV disinfection prior to relocating the discharge point to the Potomac River. Due to the distance between the final treatment unit and the discharge point, the facility opted to switch to chlorination in order to reduce the potential regrowth of bacteria prior to discharge. Chlorination occurs pre- and post-sand filtration to reduce biological growth in the filters and for disinfection of the final effluent, respectively.

The facility did not install a chlorine contact tank during the change in disinfection methods but does achieve the required 30 minute retention time while the effluent is being pumped to the Outfall, a distance of 3.5 miles. Due to the nonexistent chlorine contact tank, this permit will only require that chlorine be monitored after dechlorination. In addition, the proposed bacteria limitations will ensure that adequate disinfection is achieved and maintained.

Staff calculated WLAs for Total Residual Chlorine (TRC) using current critical flows and the mixing allowance. In accordance with current DEQ guidance, staff used a default data point of 0.2 mg/L and the calculated WLAs to derive limits. A monthly average of 0.011 mg/L and a weekly average limit of 0.014 mg/L are proposed for the 7.5 MGD facility (see **Attachment 13**).

3) Metals/Organics:

Three metals were reported above the quantification level on Form 2A, Part D of the permit application package; Copper, Nickel and Zinc. As stated previously, metal limitations are based on the hardness of the receiving stream and the effluent. The Water Quality Criteria for both the State of Maryland (COMAR 26.08.02 et seq.) and Virginia (9 VAC 25-260-00 et seq.) are presented below at a hardness of 100 mg/L as $CaCO_3$:

Metal	Water Quality Criteria			
	Virginia		Maryland	
	Acute	Chronic	Acute	Chronic
Copper	13 µg/L	9.0 µg/L	13 µg/L	9.0 µg/L
Nickel	180 µg/L	20 µg/L	470 µg/L	52 µg/L
Zinc	120 µg/L	120 µg/L	120 µg/L	120 µg/L

It is staff's best professional judgement that by utilizing the Virginia Water Quality Criteria, any proposed limits will be protective of Maryland waters.

It was determined that no limits were warranted for Nickel and Zinc based on the sampling results as reported in the application package. After careful review of the data for Copper, it was questioned whether the reported result was indicative of the effluent since sampling occurred during unusually low flows. Therefore, the facility conducted three separate sampling events on the 10th, 14th and 16th of April 2008, during average flow conditions. The Copper results reported were 9µg/L, 10 µg/L and 10µg/L; respectively, producing an average of 9.7 µg/L. Utilizing these new data points collected during normal, average flow conditions, it was determined that no Copper limits are warranted.

See **Attachment 14** for the April 2008 Copper sampling results and **Attachment 15** for limit determinations.

d). Effluent Limitations and Monitoring, Outfall 001 – Conventional and Non-Conventional Pollutants

No changes to the Dissolved Oxygen (D.O.) and pH limitations, as governed by the State of Maryland Permit MD0066184, are proposed.

Total Kjeldahl Nitrogen (TKN) limitations are proposed to replace the current Ammonia as N limitations.

$cBOD_5$ monitoring is proposed since BOD_5 may not provide a reliable measure of the oxygen demand of the effluent. Nitrifying bacteria utilize a large amount of oxygen to consume unoxidized nitrogen and ammonia-nitrogen. $cBOD_5$ monitoring eliminates the impact of nitrification on effluent limits. EPA studies have concluded that a BOD_5 limit is effectively equivalent to 1.2 times a $cBOD_5$ limit. Given that the facility currently has a monthly average BOD_5 limit of 12 mg/L, a $cBOD_5$ monthly average limit of 10 mg/L is proposed.

It is staff's practice to equate the TSS limits with the $cBOD_5$ limits since the two pollutants are closely related in terms of treatment of domestic sewage. Therefore; the current TSS monthly average limit of 20 mg/L, as governed by the State of Maryland Permit MD0066184, will be reduced to a monthly average limit of 10 mg/L.

The weekly average limit for $cBOD_5$ and TSS will be 15 mg/L based on a multiplier of 1.5 times the monthly average.

pH limitations are set at the State of Maryland Water Quality Criteria.

E. coli limitations are in accordance with the Virginia Water Quality Standards 9 VAC25-260-170 and are equivalent to the State of Maryland Water Quality Standards COMAR 26.08.02 et seq.

e). Effluent Annual Average Limitations and Monitoring, Outfall 001 – Nutrients

Maryland and Virginia, along with other signatory Bay States, signed the Chesapeake 2000 Agreement in order to restore the water quality in the Chesapeake Bay and its tributaries. The Agreement set forth annual loading goals of nitrogen and phosphorus for each State in the Bay watershed. The established limitations will allow for nutrient reductions from this facility; thus, achieving and maintaining water quality goals under the Agreement.

VPDES Regulation 9 VAC 25-31-220(D) requires effluent limitations that are protective of both the numerical and narrative water quality standards for state waters, including the Chesapeake Bay.

As discussed in Section 15, significant portions of the Chesapeake Bay and its tributaries are listed as impaired with nutrient enrichment cited as one of the primary causes. Virginia has committed to protecting and restoring the Bay and its tributaries.

The Virginia State Water Control Board adopted new Water Quality Criteria for the Chesapeake Bay in March 2005. In addition to the Water Quality Standards, there are three new regulations that necessitate nutrient limitations:

- 9 VAC 25-40 - *Regulation for Nutrient Enriched Waters and Dischargers within the Chesapeake Bay Watershed* requires discharges with design flows of $\geq$ 0.04 MGD to treat for TN and TP to either BNR levels (TN = 8 mg/l; TP = 1.0 mg/l) or SOA levels (TN = 3.0 mg/l and TP = 0.3 mg/l).
- 9 VAC 25-720 – *Water Quality Management Plan Regulation* sets forth TN and TP maximum wasteload allocations for facilities with design flows of $\geq$ 0.5 MGD limiting the mass loading from these discharges.
- 9 VAC 25-820 *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia* was approved by the State Water Control Board on 6 September 2006 and became effective 1 January 2007. This regulation specifies and controls the nitrogen and phosphorus loadings from facilities and specifies facilities that must register under the general permit. Nutrient loadings for those facilities registered under the general permit as well as compliance schedules and other permit requirements, shall be authorized, monitored, limited, and otherwise regulated under the general permit and not this individual permit.

Monitoring for Nitrates + Nitrites, Total Kjeldahl Nitrogen, Total Nitrogen and Total Phosphorus are included in this permit. The monitoring is needed to protect the Water Quality Standards of the Chesapeake Bay. Monitoring frequencies are set at the frequencies set forth in 9 VAC 25-820.

Annual average effluent limitations, as well as monthly and year to date calculations, for Total Nitrogen and Total Phosphorus are included in this individual permit.

For the 7.5 MGD flow tier, a concentration limit of 8.0 mg/L TN annual average is needed based on 9 VAC 40-70.A.(4). The limit is based in part on point source grant and operation and maintenance agreement contract #440-S-98-07. The grant agreement summary is found within the permit reissuance file. The concentration limit of 2.0 mg/L TP annual average will be carried forward from the current Maryland permit (MD0066184). Loading limits will be governed by the general permit mentioned above.

For the 10 MGD flow tier expansion, concentration limits of 4.0 mg/L TN and 0.3 mg/L TP annual averages are needed based on 9 VAC 25-720-50-C. Loading limits will be governed by the general permit mentioned above.

f). Effluent Limitations and Monitoring Summary

The effluent limitations are presented in the following tables. Limits were established for $cBOD_5$, Total Suspended Solids, Total Kjeldahl Nitrogen, pH, Dissolved Oxygen, Total Residual Chlorine and *E. coli*.

The limit for Total Suspended Solids is based on Best Professional Judgement.

The mass loading (kg/d) for monthly and weekly averages were calculated by multiplying the concentration values (mg/L) with the flow values (in MGD) and a conversion factor of 3.785.

The mass loading (lb/d) for monthly and weekly averages were calculated by multiplying the concentration values (mg/L) with the flow values (in MGD) and a conversion factor of 8.3438.

Sample Type and Frequency are in accordance with the recommendations in the VPDES Permit Manual.

18. Antibacksliding:

This facility was previously permitted by the State of Maryland prior to this issuance. The backsliding proposed conforms to the anti-backsliding provisions of Section 402(o) of the Clean Water Act, 9 VAC 25-31-220.L. and 40 § CFR 122.44.

The Organic Total Nitrogen and Total Orthophosphate that are in the current Maryland permit (MD0066184) are monitored under the facility's General Watershed Permit for Total Nitrogen and Total Phosphorus Discharges (VAN010061).

19a. Effluent Limitations/Monitoring Requirements:

Design flow is 7.5 MGD.

Effective Dates: During the period beginning with the permit's effective date and lasting until the issuance of the CTO for the 10 MGD facility or the expiration date; whichever occurs first.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	N/A	NL	N/A	N/A	NL	Continuous	TIRE
pH	3	N/A	N/A	6.5 S.U.	8.5 S.U.	1/D	Grab
$cBOD_5$	3,4	10 mg/L 280 kg/day	15 mg/L 420 kg/day	N/A	N/A	1/D	24H-C
Total Suspended Solids (TSS)	2	10 mg/L 280 kg/day	15 mg/L 420 kg/day	N/A	N/A	1/D	24H-C
DO	3,4	N/A	N/A	5.0 mg/L	N/A	1/D	Grab
Total Kjeldahl Nitrogen (TKN)	3,4	3.0 mg/L 190 lb/day	4.5 mg/L 280 lb/day	N/A	N/A	1/D	24H-C
E. coli (Geometric Mean)	3,4	126 n/100mL	N/A	N/A	N/A	1/D	Grab
Total Residual Chlorine (after dechlorination)	3,4	0.011 mg/L	0.014 mg/L	N/A	N/A	1/D	Grab
Nitrate+Nitrite, as N	4,5	NL mg/L	N/A	N/A	N/A	1/W	24H-C
Total Nitrogen [a.]	4,5	NL mg/L	N/A	N/A	N/A	1/W	Calculated
Total Nitrogen – Year to Date [b.]	4,5	NL mg/L	N/A	N/A	N/A	1/M	Calculated
Total Nitrogen - Calendar Year [b.]	4,5	8.0 mg/L	N/A	N/A	N/A	1/Y	Calculated
Total Phosphorus	4,5	NL mg/L	N/A	N/A	N/A	1/W	24H-C
Total Phosphorus – Year to Date [b.]	4,5	NL mg/L	N/A	N/A	N/A	1/M	Calculated
Total Phosphorus - Calendar Year [b.]	4,5	2.0 mg/L	N/A	N/A	N/A	1/Y	Calculated
Chronic Toxicity – *C. dubia* (TU_c)		N/A	N/A	N/A	NL	1/Y	24H-C
Chronic Toxicity – *P. promelas* (TU_c)		N/A	N/A	N/A	NL	1/Y	24H-C

The basis for the limitations codes are:

1. Federal Effluent Requirements
2. Best Professional Judgement
3. Maryland Water Quality Standards (COMAR 26.08.02 et seq.)
4. Virginia Water Quality Standards (9 VAC 25-260-00 et seq.)
5. 9 VAC 25-40 (Nutrient Regulation)

MGD = Million gallons per day.
N/A = Not applicable.
NL = No limit; monitor and report.
S.U. = Standard units.
TIRE = Totalizing, indicating and recording equipment.

1/D = Once every day.
1/W = Once every week.
1/M = Once every month.
1/Y = Once every year.

24H-C = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the monitored 24-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of twenty-four (24) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum twenty-four (24) grab samples obtained at hourly or smaller intervals may be collected where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by 10% or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

a. Total Nitrogen = Sum of TKN plus Nitrate+Nitrite.

b. See Section 20.a. for the calculation of the Nutrient Calculations.

19b. Effluent Limitations/Monitoring Requirements:

Design flow is 10 MGD.

Effective Dates: During the period beginning with the issuance of the CTO for the 10 MGD facility and lasting until the expiration date.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	N/A	NL	N/A	N/A	NL	Continuous	TIRE
pH	3	N/A	N/A	6.5 S.U.	8.5 S.U.	1/D	Grab
$cBOD_5$	3,4	10 mg/L 380 kg/day	15 mg/L 570 kg/day	N/A	N/A	1/D	24H-C
Total Suspended Solids (TSS)	2	10 mg/L 380 kg/day	15 mg/L 570 kg/day	N/A	N/A	1/D	24H-C
DO	3,4	N/A	N/A	5.0 mg/L	N/A	1/D	Grab
Total Kjeldahl Nitrogen (TKN)	3,4	3.0 mg/L 250 lb/day	4.5 mg/L 380 lb/day	N/A	N/A	1/D	24H-C
E. coli (Geometric Mean)	3,4	126 n/100mL	N/A	N/A	N/A	1/D	Grab
Total Residual Chlorine (after dechlorination)	3,4	0.011 mg/L	0.013 mg/L	N/A	N/A	1/D	Grab
Nitrate+Nitrite, as N	4,5	NL mg/L	N/A	N/A	N/A	1/W	24H-C
Total Nitrogen [a.]	4,5	NL mg/L	N/A	N/A	N/A	1/W	Calculated
Total Nitrogen – Year to Date [b.]	4,5	NL mg/L	N/A	N/A	N/A	1/M	Calculated
Total Nitrogen - Calendar Year [b.]	4,5	4.0 mg/L	N/A	N/A	N/A	1/Y	Calculated
Total Phosphorus	4,5	NL mg/L	N/A	N/A	N/A	1/W	24H-C
Total Phosphorus – Year to Date [b.]	4,5	NL mg/L	N/A	N/A	N/A	1/M	Calculated
Total Phosphorus - Calendar Year [b.]	4,5	0.3 mg/L	N/A	N/A	N/A	1/Y	Calculated
Chronic Toxicity – *C. dubia* (TU_c)		N/A	N/A	N/A	NL	1/Q	24H-C
Chronic Toxicity – *P. promelas* (TU_c)		N/A	N/A	N/A	NL	1/Q	24H-C

The basis for the limitations codes are:

1. Federal Effluent Requirements
2. Best Professional Judgement
3. Maryland Water Quality Standards (COMAR 26.08.02 et seq.)
4. Virginia Water Quality Standards (9 VAC 25-260-00 et seq.)
5. 9 VAC 25-40 (Nutrient Regulation)

MGD = Million gallons per day.
N/A = Not applicable.
NL = No limit; monitor and report.
S.U. = Standard units.
TIRE = Totalizing, indicating and recording equipment.

1/D = Once every day.
1/W = Once every week.
1/M = Once every month.
1/Q = Once every calendar quarter.
1/Y = Once every year.

24H-C = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the monitored 24-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of twenty-four (24) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum twenty-four (24) grab samples obtained at hourly or smaller intervals may be collected where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by 10% or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

The quarterly monitoring periods shall be January through March, April through June, July through September and October through December. The DMR shall be submitted no later than the 10th day of the month following the monitoring period

a. Total Nitrogen = Sum of TKN plus Nitrate+Nitrite.

b. See Section 20.a. for the calculation of the Nutrient Calculations.

20. Other Permit Requirements:

a) Part I.B. of the permit contains quantification levels and compliance reporting instructions.

9 VAC 25-31-190.L.4.c. requires an arithmetic mean for measurement averaging and 9 VAC 25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Specific analytical methodologies for toxics are listed in this permit section as well as quantification levels (QLs) necessary to demonstrate compliance with applicable permit limitations or for use in future evaluations to determine if the pollutant has reasonable potential to cause or contribute to a violation. Required averaging methodologies are also specified.

The calculations for the Nitrogen and Phosphorus parameters shall be in accordance with the calculations set forth in 9 VAC 25-820 *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia*. §62.1-44.19:13 of the Code of Virginia define how annual nutrient loads are to be calculated; this is carried forward in 9 VAC 25-820-70. As annual concentrations (as opposed to loads) are limited in the individual permit, these reporting calculations are intended to reconcile the reporting calculations between the permit programs, as the permittee is collecting a single set of samples for the purpose of ascertaining compliance with two permits.

b) Permit Section Part I.C., details the requirements for Toxics Management Program.

The VPDES Permit Regulation at 9 VAC 25-31-210 requires monitoring and 9 VAC 25-31-220.I, requires limitations in the permit to provide for and assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. A TMP is imposed for municipal facilities with a design rate >1.0 MGD, with an approved pretreatment program or required to develop a pretreatment program or those determined by the Board based on effluent variability, compliance history, IWC and receiving stream characteristics. (See **Attachment 16**).

c) Permit Section Part I.D., details the requirements of a Pretreatment Program.

The VPDES Permit Regulation at 9 VAC 25-31-210 requires monitoring and 9 VAC 25-31-220.D. requires all discharges to protect water quality. The VPDES Permit Regulation at 9 VAC 25-31-730. through 900., and 40 CFR Part 403 requires POTWs with a design flow of >5 MGD and receiving from Industrial Users (IUs) pollutants which pass through or interfere with the operation of the POTW or are otherwise subject to pretreatment standards to develop a pretreatment program.

WPCF staff requested that the formal requirements set forth under 9 VAC 25-31-730 through 900 be waived based on the fact that this facility does not receive pollutants from any Significant Industrial Users (SIUs). The Town of Leesburg adopted a Sewer Use Ordinance in October 2003, with implementation in July 2004. All commercial facilities are being inspected at least annually and those facilities with grease traps are required to provide pumping records to the Town.

It is staff's best professional judgement that this permit requires the continuation of the current inspection/notification program under the 2003 Sewer Use Ordinance. The soil amendment that is derived from the solids handling process is in direct contact with the general public. Continued monitoring of current facilities and new non-domestic water and sewer accounts will aide in reduced potential interference with plant operations and the continued beneficial use of the biosolids.

d) Permit Section Part 1.E. details requirements of the Sewage Sludge Management Plan, Sludge Monitoring and Additional Reporting Requirements.

1. Regulations:

The VPDES Permit Regulation (VAC 25-31-10 et seq.), has incorporated technical standards for the use or disposal of sewage sludge; specifically land application and surface disposal promulgated under 40 CFR Part 503.

The Permit Regulation (9 VAC 25-31-420) also establishes the standards for the use or disposal of sewage sludge. This part establishes standards that consist of general requirements, pollutant limits, management practices and operational standards for the final use or disposal of sewage sludge generated during the treatment of domestic sewage in the treatment works.

2. Evaluations:

Sludge Classification:

The Leesburg WPCF is considered a Class I sludge management facility. The permit regulation (9 VAC 25-31-500) defines a Class I sludge management facility as any POTW which is required to have an approved pretreatment program defined under Part VII of the VPDES Permit Regulation (9 VAC 25-31-730 to 900) and/or any treatment works treating domestic sewage sludge that has been classified as a Class I facility by the Board because of the potential for its sewage sludge use or disposal practice to adversely affect public health and the environment.

Sludge Pollutant Concentration:

The average pollutant concentrations from sewage sludge analyses provided as part of the Leesburg WPCF permit reissuance application are presented in Table 5. The analysis results are from samples collected in April 2007.

TABLE 5
LEESBURG WPCF RESULTS

Pollutant	Average Concentration (mg/kg dry weight)	Sample Type
Arsenic	1.1	composite
Cadmium	2.3	composite
Copper	828	composite
Lead	29.8	composite
Mercury	0.91	composite
Molybdenum	12.5	composite
Nickel	14.9	composite
Selenium	6.0	composite
Zinc	665	composite

All sewage sludge applied to the land must meet the ceiling concentration for pollutants listed in Table 6. Sewage sludge applied to the land must also meet either pollutant concentration limits, cumulative pollutant loading rate limits or annual pollutant loading rate limits, also listed in Table 6.

Cumulative pollutant loading limits or annual pollutant loading limits may be applied to sewage sludge exceeding pollutant concentration limits but meeting the ceiling concentrations, depending upon the levels of treatment achieved and the form (bulk or bag) of sludge applied. It should be noted that ceiling concentration limits are instantaneous values and pollutant concentration limits are monthly average values. Calculations of cumulative pollutant loading should be based on the monthly average values and the annual whole sludge application rate.

TABLE 6
SEWAGE SLUDGE POLLUTANT LIMITS

Pollutant	Ceiling Concentration Limits for All Sewage Sludge Applied to Land (mg/kg)*	Pollutant Concentration Limits for EQ and PC Sewage Sludge (mg/kg)*	Cumulative Pollutant Loading Rate Limits for CPLR Sewage Sludge (kg/hectare)	Annual Pollutant Rate Limits for APLR Sewage Sludge (kg/hectare/356 day period)**
Arsenic	75	41	41	2.0
Cadmium	85	39	39	1.9
Copper	4,300	1,500	1,500	75
Lead	840	300	300	15
Mercury	57	17	17	0.85
Molybdenum	75	---	---	---
Nickel	420	420	420	21
Selenium	100	100	100	5.0
Zinc	7,500	2,800	2,800	140
Applies to:	All sewage sludge that is land applied	Bulk sewage sludge and bagged sewage sludge	Bulk sewage sludge	Bagged sewage
From VPDES Permit Reg. Part VI	Table 1, 9 VAC 25-31-540	Table 3, 9 VAC 25-31-540	Table 2, 9 VAC 25-31-540	Table 4, 9 VAC 25-31-540

*Dry-weight basis
**Bagged sewage sludge is sold or given away in a bag or other container.

Comparing data from Table 5 with Table 6 shows that metal concentrations are significantly below the ceiling and the pollutant concentration requirements.

3. Options for Meeting Land Application:

There are four equally safe options for meeting land application requirements. The options include the Exceptional Quality (EQ) option, the Pollutant Concentration (PC) option, the Cumulative Pollutant Loading Rate (CPLR) option and the Annual Pollutant Loading Rate (APLR) option.

Exceptional Quality (EQ) is a type of sludge that is sold or given away in a bag or other container for application to the land due to the pathogen reduction achieved during treatment. The sludge from the Leesburg WPCF is considered Exceptional Quality (EQ) sewage sludge for the following reasons:

a). Meets the PC limits in Table 1 of VPDES Permit Regulation Part VI, 9 VAC 25-31-540;

b). VPDES Permit Regulation, Part VI, Subpart D, 9 VAC 25-31-690 through 720, establishes the requirements for pathogen reduction in sewage sludge. The Leesburg WPCF is considered to produce a Class A sludge in accordance with the regulation (9 VAC 25-31-710.A.7.; Class A – Alternative 7). Alternative 7 defines Class A sludge as: "Sewage sludge that is used or disposed shall be treated in one of the processes to further reduce pathogens as described in 9 VAC 25-31-710.E". The Leesburg WPCF utilizes Alternative 2, Heat Drying, in order to produce Class A Biosolids. The sludge passes through a belt-press and then a rotary drum dryer where it is subjected to hot gases to further reduce pathogens and the moisture content of the biosolids. The pathogen reduction requirements are found in 9 VAC 25-31-710.A.7, Alternative 5, which states that the fecal coliform density in the sewage sludge shall be less than 1,000 Most Probable Number (MPN) per gram of total solids (dry weight basis); and

c). The VPDES Permit Regulation, Part VI, Subpart D, (9 VAC 25-31-690 through 720) also establishes the requirements for Vector Attraction Reduction in sewage sludge. Based on the information supplied with the VPDES Sludge Application, the Leesburg WPCF meets the requirements for Vector Attraction Reduction as defined by (9 VAC 25-31-720.B.8.): "the percent solids of sewage sludge that contains unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 90% based on the moisture content and total solids prior to mixing with other materials".

4. Parameters to be Monitored:

In order to assure the sludge quality, the following parameters require monitoring: Arsenic, Cadmium, Copper, Lead, Mercury, Molybdenum, Nickel, Selenium and Zinc.

The Leesburg WPCF is licensed by the Virginia Department of Agricultural and Consumer Services (VDACS) in order to distribute the pelletized Class A Biosolids to the general public. The facility is regulated under the Specialty Fertilizer License Number 59-44800-107. Sewage sludge that is sold or given away in a bag or other container for application to the land must be labeled, or an information sheet made available, which states the percentage of each plant nutrient available. A copy of the label and product brochure is included in the permit file.

5. Monitoring Frequency:

The monitoring frequency is based on the amount of sewage sludge generated in a given 365-day period. The permit application indicated that the total dry metric tons of sewage sludge generated at the Leesburg WPCF are 913 dry metric tons per 365-day period. The monitoring frequency for facilities that produce between 290 and 1,500 metric tons per 365-day period is once per quarter.

The Leesburg WPCF is required to provide the results of all monitoring performed in accordance with Part I.A., and information on management practices and appropriate certifications no later than February 19th of each year (as required by the 503 regulations) to the Department of Environmental Quality – Northern Regional Office. Each report must document the previous calendar year's activities.

6. Sampling:

Representative sampling is an important aspect of monitoring. Because the pollutant limits pertain to the quality of the final sewage sludge applied to the land, samples must be collected after the last treatment process prior to distribution. Composite samples shall be required for all samplings from this facility.

7. Sludge Management Plant (SMP):

The SMP is required to be part of the VPDES permit application. The VPDES Sewage Sludge Permit Application Form and its attachments will constitute as the applicant's SMP. Any proposed sewage treatment works treating domestic sewage must submit a SMP with the appropriate VPDES permit application forms at least 180 days prior to the date proposed for commencing operations. The permittee shall conduct all sewage sludge use or disposal activities in accordance with the SMP approved with the issuance of this permit. Any proposed changes in the sewage sludge use or disposal practices or procedures followed by the permittee shall be documented and submitted for Virginia Department of Environmental Quality review and approval no less than 90 days prior to the effective date of the changes.

Upon approval, the SMP becomes an enforceable part of the permit. The permit may be modified or alternatively revoked and reissued to incorporate limitations/conditions necessitated by substantial changes in sewage sludge use or disposal practices.

The Leesburg WPCF submitted the VPDES Sewage Sludge Permit Application Form and its attachments on 27 November 2007. The application is on file at the Department of Environmental Quality – Northern Regional Office.

8. Reporting Requirements:

The reporting requirements are for POTWs with a design flow rate equal to or greater than 1 MGD (majors), POTWs that serve a population of 10,000 or greater and Class I sludge management facilities. A permit special condition, which requires these generators to submit an annual report on February 19th of each year, is included. The Leesburg WPCF shall use the Discharge Monitoring Report (DMR) forms as part of the annual report. A sample form (SP1 and S01) with proper DMR parameter codes and its instructions are provided. In addition to the DMR forms, the generators who land apply sewage sludge are responsible for submitting the additional information required by 9 VAC 25-31-590, *i.e.*, appropriate certification statements, descriptions of how pathogen and vector attraction reduction requirements are met, descriptions of how the management practices (if applicable) are being met and descriptions of how site restrictions (if applicable) are being met.

9. Records Keepings:

This special condition outlines record retention requirements for sludge meeting Class A pathogen reduction and vector attraction reduction alternative 1-10. Table 7 presents the record keeping requirements.

TABLE 7 RECORD KEEPING FOR EQ SLUDGE	
1.	Pollutant concentrations of each pollutant in Part I.A.3. of the permit;
2.	Description of how the pathogen reduction requirement in Part I.A.3. of the permit are met;
3.	Description of how the vector attraction requirements in Part I.A.3. of the permit are met;
4.	Description of how the management practice specified in the approved Sludge Management Plan and/or the permit are met;
5.	Description of how the site restriction specified in the Sludge Management Plan and/or the permit are met; and
6.	Certification statement in Part I.E.3.b.(2).(e). of the permit.

21. Other Special Conditions:

a) 95% Capacity Reopener. The VPDES Permit Regulation at 9 VAC 25-31-200.B.2. requires all POTWs and PVOTWs develop and submit a plan of action to DEQ when the monthly average influent flow to their sewage treatment plant reaches 95% or more of the design capacity authorized in the permit for each month of any three consecutive month period. This facility is a POTW.

b) Indirect Dischargers. Required by VPDES Permit Regulation, 9 VAC 25-31-280 B.9 for POTWs and PVOTWs that receive waste from someone other than the owner of the treatment works.

c) O&M Manual Requirement. Required by Code of Virginia §62.1-44.19; Sewage Collection and Treatment Regulations, 9 VAC 25-790; VPDES Permit Regulation, 9 VAC 25-31-190.E. The permittee submitted for approval an Operations and Maintenance (O&M) Manual to the Department of Environmental Quality, Northern Regional Office (DEQ-NRO) on 15 April 2008 and was approved on 30 May 2008. Future changes to the facility must be addressed by the submittal of a revised O&M Manual within 90 days of the changes. Non-compliance with the O&M Manual shall be deemed a violation of the permit.

d) CTC, CTO Requirement. The Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9 VAC 25-790 requires that all treatment works treating wastewater obtain a Certificate to Construct prior to commencing construction and to obtain a Certificate to Operate prior to commencing operation of the treatment works.

e) Licensed Operator Requirement. The Code of Virginia at §54.1-2300 et seq. and the VPDES Permit Regulation at 9 VAC 25-31-200 D, and Rules and Regulations for Waterworks and Wastewater Works Operators (18 VAC 160-20-10 et seq.) requires licensure of operators. This facility requires a Class I operator.

f) Reliability Class. The Sewage Collection and Treatment Regulation at 9 VAC 25-790 requires sewerage works achieve a certain level of reliability in order to protect water quality and public health consequences in the event of component or system failure. The facility is required to meet Reliability Class I.

g) E3/E4. 9 VAC 25-40-70 B authorizes DEQ to approve an alternate compliance method to the technology-based effluent concentration limitations as required by subsection A of this section. Such alternate compliance method shall be incorporated into the permit of an Exemplary Environmental Enterprise (E3) facility or an Extraordinary Environmental Enterprise (E4) facility to allow the suspension of applicable technology-based effluent concentration limitations during the period the E3 or E4 facility has a fully implemented environmental management system that includes operation of installed nutrient removal technologies at the treatment efficiency levels for which they were designed.

h) Nutrient Reopener. 9 VAC 25-40-70 A authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade. 9 VAC 25-31-390 A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.

i) PCB Monitoring. This special condition shall require the permittee to monitor and report PCB concentrations in dry weather and wet weather effluent samples. The results from this monitoring shall be used to implement the PCB TMDL that was developed for the Potomac and Anacostia Rivers and approved by EPA on 31 October 2007.

j) Discharge Monitoring Report Submission. A duplicate signed copy of each Discharge Monitoring Report (DMR) shall be submitted to the Maryland Department of the Environment for review.
Reports shall be submitted to:

Compliance Program
Water Management Administration
Department of the Environment
1800 Washington Boulevard
Montgomery Park Business Center, STE 425
Baltimore, Maryland 21230-1708

k) Unauthorized, Unusual or Extraordinary Discharge Notification. Due to the proximity of major, regional drinking water supply intakes downstream of this discharge, the permittee shall notify the Fairfax County Water Authority, the Maryland Department of the Environment and the Interstate Commission on the Potomac River Basin within six (6) hours of an unauthorized, unusual or extraordinary discharge.

22. Permit Section Part II. Part II of the permit contains standard conditions that appear in all VPDES Permits. In general, these standard conditions address the responsibilities of the permittee, reporting requirements, testing procedures and records retention.

23. Changes to the Permit from the Previously Issued Permit:

a) Special Conditions:

- The Toxic Chemical Testing Special Condition contained within the Maryland discharge permit MD0066184 has been removed with this issuance.
- The Special Conditions listed in Section 21 (a-j) of this Fact Sheet have been included with this issuance.
- An Unauthorized, Unusual or Extraordinary Discharge Notification was included with this issuance.

b) Monitoring and Effluent Limitations:

Maryland Permit Number MD0066184 contained effluent limitations for Ammonia as N, Organic Total Nitrogen, Total Orthophosphate, BOD_5 and TSS. The following changes were completed with this issuance:

- The Ammonia as N limitation was replaced with a TKN limit;
- Organic Total Nitrogen and Total Orthophosphate were removed since these parameters are included in the General Watershed Permit for Total Nitrogen and Total Phosphorus Discharges (VAN010061) and reflects current agency guidance;
- The BOD_5 limit was replaced with a $cBOD_5$ limit since the permittee will now be monitoring for TKN. A monthly average limit of 10 mg/L and a weekly average limit of 15 mg/L are proposed; and
- The current TSS monthly and weekly average limitations of 20 mg/L and 30 mg/L; respectively, were reduced and set equal to the proposed $cBOD_5$ limitations.

24. Variances/Alternate Limits or Conditions: None.

25. Public Notice Information:

First Public Notice Date: 27 August 2008 Second Public Notice Date: 3 September 2008

Public Notice Information is required by 9 VAC 25-31-280 B. All pertinent information is on file and may be inspected, and copied by contacting the: Northern DEQ Regional Office, 13901 Crown Court, Woodbridge, VA 22193, Telephone No. (703) 583-3873, ddfrasier@deq.virginia.gov. See **Attachment 17** for a copy of the public notice document.

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing if public response is significant. Requests for public hearings shall state the reason why a hearing is requested, the nature of the issues proposed to be raised in the public hearing and a brief explanation of how the requester's interests would be directly and adversely affected by the proposed permit action. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given.

26. 303 (d) Listed Stream Segments and Total Max. Daily Loads (TMDL):

This section of the Potomac River has been listed as impaired due to Polychlorinated Biphenyls (PCBs), Total Phosphorus, Total Suspended Solids and Benthic/Fish Bioassessment; however, there is no approved TMDL for this particular section of the Potomac River.

Downstream of this facility, the tidal portions of the Potomac and Anacostia Rivers have a TMDL for PCBs which was approved by the EPA on 31 October 2007. This facility does not have a WLA but will be sampling in an orchestrated effort to ascertain if upstream dischargers may be contributing to the impairment.

TMDL Reopener: This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL that may be developed and approved for the receiving stream.

27. Additional Comments:

Previous Board Action(s): None.

Staff Comments: None.

Public Comment: Comments were received 25 July 2008 from the Maryland Department of the Environment:

- MDE brought to attention the inconsistent TN and TP limitations included in the first draft when compared with the nutrient wasteload allocations as listed in 9 VAC 25-720-50-C.
- The MDE also recommended that TRC, D.O. and pH monitoring frequencies be increased from once per day (1/D) to three times a day (3/D).

Comments were received from the Fairfax County Water Authority on 25 September 2008:

- Downstream Notification: The Authority requested that the permit contain a notification requirement by the permittee to immediately contact downstream water suppliers in the event of an unauthorized, unusual or extraordinary discharge. Fairfax Water's drinking water intake can be as little as six (6) hours travel time from the point of this discharge.
- Discharges, Intake, Monitoring Station and Other Items: The Authority suggested that drinking water supply intakes on the Potomac River originating from Maryland should be included in Table 2 of the Fact Sheet. Furthermore, is was requested that DEQ coordinate the Potomac River intakes with the MDE to ensure that Virginia's intakes and discharges are included in all Potomac River permits issued by MDE.
- Dulles Area Watershed Policy: DEQ should consider revising the Policy area to include the mainstem Potomac River if the facility expands beyond the planned 10 MGD.

Comments were received from Loudoun Water on 26 September 2008 stating that the facility and the proposed permit conditions are compatible with the Authority's proposed future water intake, which will be located upstream of this discharge.

The full text of the above comments can be located in the permit file.

EPA Checklist: The checklist can be found in **Attachment 18**.

Fact Sheet Attachments – Table of Contents

Leesburg Water Pollution Control Facility
VA0092282
2008 Reissuance

MEMORANDUM

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

NORTHERN REGIONAL OFFICE

13901 Crown Court Woodbridge, VA 22193

TO: VPDES Issuance File VA0092282

DATE: 24 March 2008

FROM: Douglas Frasier

SUBJECT: Flow Frequency Determination of VPDES Permit No. VA0092282
Leesburg Water Pollution Control Facility

The Town of Leesburg WPCF discharges to the Potomac River near Leesburg, Virginia. Stream flow frequencies are required at this site for use in the development of effluent limitations for this VPDES permit.

There is an USGS Gaging Station at Point of Rocks, Maryland (#01638500), upstream from the Outfall 001. The referenced gaging station has a drainage area of 9,651 square miles. The NRO Water Resource Planners ascertained that the drainage area above the Outfall for Leesburg WPCF is 10,721 square miles.

The flow frequencies shall be determined using values at the USGS Gaging Station at Point of Rocks, Maryland and adjusting them by proportional drainage areas.

Potomac River at Point of Rocks, MD (#01638500)

Drainage area	=	9,651 sq. mi.
1Q10	=	761.7 cfs
7Q10	=	873.9 cfs
30Q5	=	37,695.8 cfs
30Q10	=	1,031.9 cfs
High flow 30Q10	=	44,036.6 cfs
High flow 1Q10	=	190,850 cfs
High flow 7Q10	=	93,856.9 cfs

Potomac River at Leesburg WPCF at Outfall 001

Drainage area	=	10,721 sq. mi.	
1Q10	=	846.2 cfs	546.9 MGD*
7Q10	=	970.8 cfs	627.4 MGD*
30Q5	=	41,875.1 cfs	27,063.9 MGD*
30Q10	=	1,146.3 cfs	740.8 MGD*
High flow 30Q10	=	48,918.9 cfs	31,616.3 MGD*
High flow 1Q10	=	212,009.4 cfs	137,021.7 MGD*
High flow 7Q10	=	104,262.8 cfs	67,385.0 MGD*

*Conversion to MGD = (cfs flow measurement) x (0.6463)

The high flow months are December - May

USGS
science for a changing world

StreamStats Data-Collection Station Report

USGS Station Number	01638500
Station Name	POTOMAC RIVER AT POINT OF ROCKS, MD

Click here to link to available data on NWIS-Web for this site.

Descriptive Information

Station Type	Gaging Station, continuous record	
Regulated?	Undefined	
Period of Record		
Remarks		
Latitude (degrees NAD83)	39.27358333	39° 16' 24.9"
Longitude (degrees NAD83)	-77.54311111	77° 32' 35.2"
Hydrologic unit code	02070008	
Local Basin	-	
County	021-Frederick	
MCD	-	
Directions to station		

Physical Characteristics

Characteristic Name	Value	Units	Citation Number
24_Hour_2_Year_Precipitation	3.0500	inches	31
Contributing_Drainage_Area	9651.00	square miles	31
Drainage_Area	9651.00	square miles	31
Main_Channel_Length	270.900	miles	31
Mean_Annual_Precipitation	39.500	inches	31
Mean_Annual_Snowfall	30.600	inches	31
Mean_Basin_Elevation	1356.00	feet	31
Mean_Min_January_Temperature	23.000	degrees F	31
Mean_Max_July_Temperature	86.000	degrees F	31
Percent_Forest	59.000	percent	31
Percent_Storage	0.0440	percent	31
Soil_Infiltration	3.5600	inches	31

Stream_Slope_10_and_85_Method	5.5600	feet per mi	31

Streamflow Statistics

Statistic Name	Value	Units	Citation Number
Peak-Flow Statistics			
10_Year_Peak_Flood	221000	cubic feet per second	31
100_Year_Peak_Flood	439000	cubic feet per second	31
2_Year_Peak_Flood	104000	cubic feet per second	31
200_Year_Peak_Flood	523000	cubic feet per second	31
25_Year_Peak_Flood	298000	cubic feet per second	31
5_Year_Peak_Flood	168000	cubic feet per second	31
50_Year_Peak_Flood	364000	cubic feet per second	31
500_Year_Peak_Flood	650000	cubic feet per second	31
Log_Mean_of_Annual_Peaks	5.0240	Log base 10	31
Log_Skew_of_Annual_Peaks	0.1870	Log base 10	31
Log_STD_of_Annual_Peaks	0.2320	Log base 10	31
Mean_Annual_Flood	67000.0	cubic feet per second	31
Peak_years_with_historic_adjustment	102.000	years	31
Systematic_peak_years	96.000	years	31
WRC_Mean	5.0300	Log base 10	31
WRC_Skew	0.3260	Log base 10	31
WRC_STD	0.2390	Log base 10	31
Flood-Volume Statistics			
1_Day_10_Year_Maximum	190850	cubic feet per second	31
1_Day_100_Year_Maximum	352997	cubic feet per second	31
1_Day_2_Year_Maximum	94081.6	cubic feet per second	31
1_Day_20_Year_Maximum	235422	cubic feet per second	31
1_Day_25_Year_Maximum	250464	cubic feet per second	31
1_Day_5_Year_Maximum	148843	cubic feet per second	31
1_Day_50_Year_Maximum	299658	cubic feet per second	31
15_Day_10_Year_Maximum	63719.6	cubic feet per second	31
15_Day_100_Year_Maximum	95436.6	cubic feet per second	31
15_Day_2_Year_Maximum	37245.0	cubic feet per second	31
15_Day_20_Year_Maximum	73578.4	cubic feet per second	31
15_Day_25_Year_Maximum	76675.2	cubic feet per second	31
15_Day_5_Year_Maximum	53270.5	cubic feet per second	31
15_Day_50_Year_Maximum	86136.7	cubic feet per second	31
3_Day_10_Year_Maximum	146427	cubic feet per second	31
3_Day_100_Year_Maximum	266581	cubic feet per second	31
3_Day_2_Year_Maximum	73796.2	cubic feet per second	31

3_Day_20_Year_Maximum	179592	cubic feet per second	31
3_Day_25_Year_Maximum	190756	cubic feet per second	31
3_Day_5_Year_Maximum	115030	cubic feet per second	31
3_Day_50_Year_Maximum	227191	cubic feet per second	31
30_Day_10_Year_Maximum	44036.6	cubic feet per second	31
30_Day_100_Year_Maximum	62196.9	cubic feet per second	31
30_Day_2_Year_Maximum	27521.8	cubic feet per second	31
30_Day_20_Year_Maximum	49842.3	cubic feet per second	31
30_Day_25_Year_Maximum	51634.0	cubic feet per second	31
30_Day_5_Year_Maximum	37695.8	cubic feet per second	31
30_Day_50_Year_Maximum	57020.9	cubic feet per second	31
7_Day_10_Year_Maximum	93856.9	cubic feet per second	31
7_Day_100_Year_Maximum	157044	cubic feet per second	31
7_Day_2_Year_Maximum	50908.8	cubic feet per second	31
7_Day_20_Year_Maximum	112070	cubic feet per second	31
7_Day_25_Year_Maximum	118051	cubic feet per second	31
7_Day_5_Year_Maximum	75894.4	cubic feet per second	31
7_Day_50_Year_Maximum	137115	cubic feet per second	31
Low-Flow Statistics			
1_Day_10_Year_Low_Flow	761.701	cubic feet per second	31
1_Day_2_Year_Low_Flow	1219.17	cubic feet per second	31
1_Day_20_Year_Low_Flow	667.283	cubic feet per second	31
14_Day_10_Year_Low_Flow	926.700	cubic feet per second	31
14_Day_2_Year_Low_Flow	1448.44	cubic feet per second	31
14_Day_20_Year_Low_Flow	820.979	cubic feet per second	31
3_Day_10_Year_Low_Flow	818.904	cubic feet per second	31
3_Day_2_Year_Low_Flow	1283.69	cubic feet per second	31
3_Day_20_Year_Low_Flow	722.090	cubic feet per second	31
30_Day_10_Year_Low_Flow	1031.87	cubic feet per second	31
30_Day_2_Year_Low_Flow	1610.98	cubic feet per second	31
30_Day_20_Year_Low_Flow	918.358	cubic feet per second	31
7_Day_10_Year_Low_Flow	873.889	cubic feet per second	31
7_Day_2_Year_Low_Flow	1360.40	cubic feet per second	31
7_Day_20_Year_Low_Flow	772.119	cubic feet per second	31
7_Day_5_Year_Low_Flow	1016.23	cubic feet per second	31
90_Day_10_Year_Low_Flow	1313.75	cubic feet per second	31
90_Day_2_Year_Low_Flow	2327.50	cubic feet per second	31
90_Day_20_Year_Low_Flow	1129.89	cubic feet per second	31
Low_flow_years	84.000	years	31
Flow-Duration Statistics			
1_Percent_Duration	65162	cubic feet per second	41
10_Percent_Duration	20900	cubic feet per second	41
20_Percent_Duration	13100	cubic feet per second	41
25_Percent_Duration	11000	cubic feet per second	41

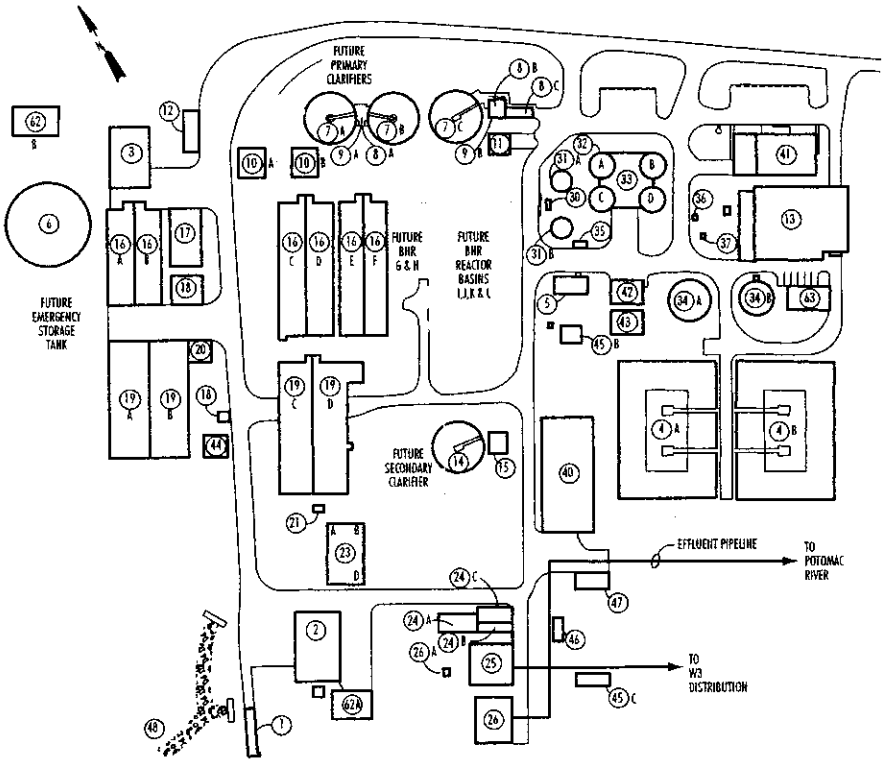
30_Percent_Duration	9290	cubic feet per second	41
40_Percent_Duration	7050	cubic feet per second	41
5_Percent_Duration	30600	cubic feet per second	41
50_Percent_Duration	5380	cubic feet per second	41
60_Percent_Duration	4080	cubic feet per second	41
70_Percent_Duration	3080	cubic feet per second	41
75_Percent_Duration	2660	cubic feet per second	41
80_Percent_Duration	2290	cubic feet per second	41
90_Percent_Duration	1680	cubic feet per second	41
95_Percent_Duration	1340	cubic feet per second	41
99_Percent_Duration	940	cubic feet per second	41
Annual Flow Statistics			
Daily_flow_years	89.000	years	31
Mean_Annual_Flow	9422.00	cubic feet per second	31
Stand_Dev_of_Mean_Annual_Flow	2880.00	cubic feet per second	31
Monthly Flow Statistics			
April_Mean_Flow	16560.0	cubic feet per second	31
April_STD	8658.00	cubic feet per second	31
August_Mean_Flow	4301.00	cubic feet per second	31
August_STD	3806.00	cubic feet per second	31
December_Mean_Flow	8352.00	cubic feet per second	31
December_STD	6309.00	cubic feet per second	31
February_Mean_Flow	14450.0	cubic feet per second	31
February_STD	8005.00	cubic feet per second	31
January_Mean_Flow	11160.0	cubic feet per second	31
January_STD	6639.00	cubic feet per second	31
July_Mean_Flow	4531.00	cubic feet per second	31
July_STD	2806.00	cubic feet per second	31
June_Mean_Flow	8190.00	cubic feet per second	31
June_STD	5988.00	cubic feet per second	31
March_Mean_Flow	19640.0	cubic feet per second	31
March_STD	10380.0	cubic feet per second	31
May_Mean_Flow	12150.0	cubic feet per second	31
May_STD	7066.00	cubic feet per second	31
November_Mean_Flow	5201.00	cubic feet per second	31
November_STD	4136.00	cubic feet per second	31
October_Mean_Flow	5163.00	cubic feet per second	31
October_STD	6391.00	cubic feet per second	31
September_Mean_Flow	3520.00	cubic feet per second	31
September_STD	3282.00	cubic feet per second	31
General Flow Statistics			
Average_daily_streamflow	9510.902	cubic feet per second	41
Maximum_daily_flow	434000	cubic feet per second	41
Minimum_daily_flow	540	cubic feet per second	41

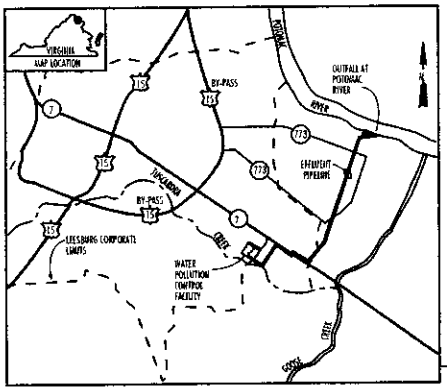
Std_Dev_of_daily_flows	13729.221	cubic feet per second	41
Base_Flow_Statistics			
Average_BFI_value	0.519	dimensionless	42
Number_of_years_to_compute_BFI	108	years	42
Std_dev_of_annual_BFI_values	0.068	dimensionless	42

Citations

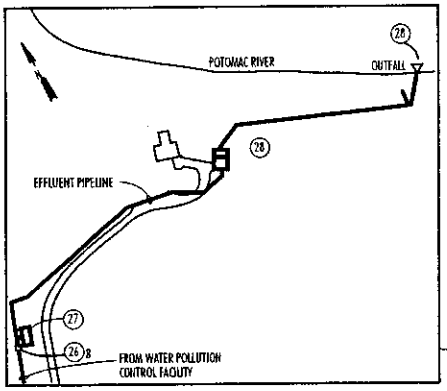
Citation Number	Citation Name
31	Imported from Basin Characteristics file
41	Wolock, D.M., 2003, Flow characteristics at U.S. Geological Survey streamgages in the conterminous United States: U.S. Geological Survey Open-File Report 03-146, digital data set, available on World Wide Web at URL http://water.usgs.gov/lookup/getspatial?qsitesdd
42	Wolock, D.M., 2003, Base-flow index grid for the conterminous United States: U.S. Geological Survey Open-File Report 03-263, digital data set, available on World Wide Web at URL http://water.usgs.gov/lookup/getspatial?bfi48grd

Water Pollution Control Facility





Vicinity Map



Outfall at Potomac River

UNIT IDENTIFICATION

1. RECEIVING STATION
2. INFLUENT PUMPING STATION
3. PISTA GRIT BUILDING
4. EMERGENCY STORAGE BASINS A AND B
5. EMERGENCY STORAGE BASIN BLOWER BUILDING
6. EMERGENCY STORAGE TANK
7. PRIMARY CLARIFIERS A, B, AND C
8. PRIMARY SCUM PITS A AND B SCUM HANDLING STATION C
9. PRIMARY PUMP STATIONS A AND B

10A. BNR FLOW SPLITTER

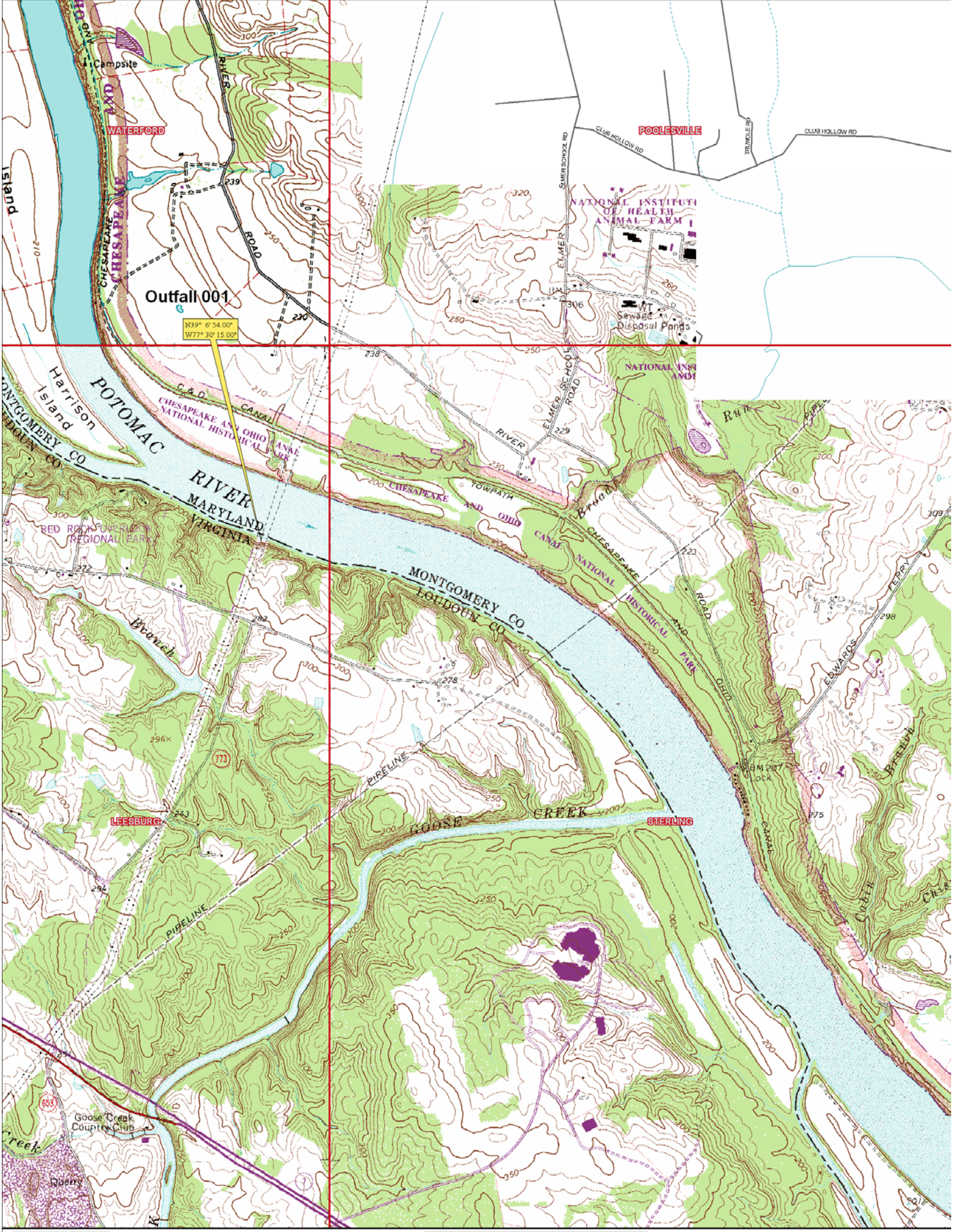
10B. DIURNAL EQUALIZATION FLOW SPLITTER

11. PRIMARY SCUM SCREEN BUILDING
12. METHANOL BUILDING
13. SOLIDS HANDLING BUILDING
14. RECYCLE EQUALIZATION BASIN
15. RECYCLE EQUALIZATION PUMP STATION
16. BIOREACTORS A, B, C, D, E, AND F
17. PROCESS BLOWER BUILDING
18. RAS/WAS PUMP STATION—METERING CHAMBER
19. SECONDARY CLARIFIERS A, B, C, AND D
20. SECONDARY SCUM PUMP STATION AND PIT
21. SAND FILTER FLOW SPLITTER
23. SAND FILTER BUILDING
24. CHEMICAL FEED BUILDING A
    FERRIC CHLORIDE CONTAINMENT STRUCTURE B
    SODIUM HYPOCHLORITE CONTAINMENT STRUCTURE C
25. W3 PUMPING STATION
26. EFFLUENT PS AND METER CHAMBERS A AND B
27. DECHLORINATION BUILDING AND
    SODIUM BISULFITE STRUCTURE
28. POTOMAC RIVER OUTFALL
30. GRAVITY THICKENER SPLITTER
31. GRAVITY THICKENERS A AND B
32. PRIMARY DIGESTERS A, B, C, AND D
33. DIGESTER CONTROL BUILDING
34. SLUDGE STORAGE TANKS A AND B
35. SLUDGE LOADING STATION
36. WASTE GAS CONTROL CHAMBER
37. WASTE GAS BURNER
40. COVERED STORAGE PAD
41. ADMINISTRATIVE BUILDING
42. MAINTENANCE SHOP
43. MAINTENANCE STORAGE BUILDING
44. GROUNDS MAINTENANCE BUILDING
45. ELECTRICAL SUBSTATION B AND C
46. GENERATOR SET
47. GENERATOR SET FUEL STORAGE TANK
48. STORMWATER CONTAINMENT BASIN AND OUTFALL

62A. INFLUENT PUMP STATION ODOR CONTROL BIOFILTER

62B. PRIMARY AND GRIT ODOR CONTROL BIOFILTER

63. ODOR CONTROL RTO



Tuscarora Landscaper's Choice

SOIL AMENDMENT PRODUCT

- ✔ Slow Release
- ✔ Rich In Iron For Greener Grass, Shrubs & Plants
- ✔ Adds Organic Matter
- ✔ Non-burning

Net Weight 25 lbs.

Produced by
Town of Leesburg in Virginia
Utilities Department
Water Pollution Control Division

Tuscarora
Landscaper's Choice

Naturally Occurring Nutrient Levels

Total Nitrogen (N)	6.00%
1% water soluble organic nitrogen	
5% water insoluble nitrogen	
Available Phosphate (P2 O5)	6.00%
Phosphorus (P)	3.00%
Calcium (Ca)	2.00%
Iron (Fe)	1.00%
Sulfur (S)	0.75%
Potassium (K)	0.50%
Magnesium (Mg)	0.40%
Sodium (Na)	0.05%
Zinc (Zn)	0.02%
Manganese (Mn)	0.01%

Recommended Uses:

Tuscarora Landscaper's Choice is an organic by-product converted into a valuable all natural product. It is an excellent soil amendment for lawns, trees, shrubs, and flowers.
It provides a valuable source of nutrients which are essential to plant growth and provides organic matter which enhances soil structure and quality. Tuscarora Landscaper's Choice can be applied through any spreader used for granular material. The use of Tuscarora Landscaper's Choice soil amendment will support the ongoing efforts in the protection, restoration and preservation of the Potomac River and Chesapeake Bay watersheds.

Established Lawns
For most lawns in the Mid-Atlantic area using cool-season grasses (fescue, bluegrass, ryegrass), three applications per year are recommended (spring, late summer, fall).
Apply at a rate of 50 lbs. per 3,000 sq. ft.

New Lawns
Apply to soil at a rate of 50 lbs. per 1,500 sq. ft. before seeding. Cover the entire area and rake into the top 2 inches of soil.

Trees and Shrubs
Single Plantings: Use 5 lbs. of product for each inch of tree trunk diameter measured 4 ft. from the ground, or 2 cups of product per shrub.

New Shrub Beds: Prior to planting, apply 5 lbs. of product per 100 sq. ft. to the shrub bed and mix it into the soil.

Established Shrubs: Apply 1 to 2 cups of product around the base of shrubs and mix it into the soil. Best results are obtained in the spring.

Flowers and Vegetables
Annuals: Uniformly apply 3 lbs. of product per 100 sq. ft. of the seed bed prior to planting and work into the soil. Reapply when flower buds form with 2 lbs. per 100 sq. ft.

Perennials: Apply 2 lbs. of product per 100 sq. ft. in spring and again after blooming to strengthen plants for the following season.

Vegetables: Apply 5 lbs. per 100 sq. ft. prior to rototilling your garden.

Application Information:

2-1/2 cups of Tuscarora Landscaper's Choice equals 1 lb. A large coffee can (approximately 2-1/2 lb. size) holds 5 lbs. of product. The bulk density is approximately 45 lbs. per cubic foot. The pellets are approximately 1-2 mm in diameter (0.040 – 0.080 inches)

Tuscarora Landscaper's Choice is an organic biosolids product meeting the U.S. Environmental Protection Agencies "Exceptional Quality" standards for beneficial use. Apply this product in accordance with label directions.
Do not apply in or near any public or private water supplies including wells, streams, or lakes. Do not apply to flooded or frozen land. Store unused product away from children and pets in a cool, dry area.

If you have questions regarding this product, please call the Leesburg Water Pollution Control Facility at 703-737-7100, M-F, 8:00 AM – 5:00 PM.

Tuscarora Landscaper's Choice

Give Your Plants Some TLC

SOIL AMENDMENT PRODUCT

- ✔ Slow Release
- ✔ Rich In Iron For Greener Grass, Shrubs & Plants
- ✔ Adds Organic Matter
- ✔ Non-burning

Net Weight 50 lbs.

Produced by
Town of Leesburg in Virginia
Utilities Department
Water Pollution Control Division

Tuscarora
Landscaper's Choice

Naturally Occurring Nutrient Levels

Total Nitrogen (N)	6.00%
1% water soluble organic nitrogen	
5% water insoluble nitrogen	
Available Phosphate (P2 O5)	3.00%
Phosphorus (P)	3.00%
Calcium (Ca)	2.00%
Iron (Fe)	1.00%
Sulfur (S)	0.75%
Potassium (K)	0.50%
Magnesium (Mg)	0.40%
Sodium (Na)	0.05%
Zinc (Zn)	0.02%
Manganese (Mn)	0.01%

Recommended Uses:

Tuscarora Landscaper's Choice is an organic by-product converted into a valuable all natural product. It is an excellent soil amendment for lawns, trees, shrubs, and flowers. It provides a valuable source of nutrients which are essential to plant growth and provides organic matter which enhances soil structure and quality. Tuscarora Landscaper's Choice can be applied through any spreader used for granular material. The use of Tuscarora Landscaper's Choice soil amendment will support the ongoing efforts in the protection, restoration and preservation of the Potomac River and Chesapeake Bay watersheds.

Established Lawns

For most lawns in the Mid-Atlantic area using cool-season grasses (fescue, bluegrass, ryegrass), three applications per year are recommended (spring, late summer, fall). Apply at a rate of 50 lbs. per 3,000 sq. ft.

New Lawns

Apply to soil at a rate of 50 lbs. Per 1,500 sq. ft. before seeding. Cover the entire area and rake into the top 2 inches of soil.

Trees and Shrubs

Single Plantings: Use 5 lbs. of product for each inch of tree trunk diameter measured 4 ft. from the ground, or 2 cups of product per shrub.

New Shrub Beds: Prior to planting, apply 5 lbs. of product per 100 sq. ft. to the shrub bed and mix it into the soil.

Established Shrubs: Apply 1 to 2 cups of product around the base of shrubs and mix it into the soil. Best results are obtained in the spring.

Flowers and Vegetables

Annuals: Uniformly apply 3 lbs. of product per 100 sq. ft. of the seed bed prior to planting and work into the soil. Reapply when flower buds form with 2 lbs. per 100 sq. ft.

Perennials: Apply 2 lbs. of product per 100 sq. ft. in spring and again after blooming to strengthen plants for the following season.

Vegetables: Apply 5 lbs. per 100 sq. ft. prior to rototilling your garden.

Application Information:

2-1/2 cups of Tuscarora Landscaper's Choice equals 1 lb. A large coffee can (approximately 2-1/2 lb. size) holds 5 lbs. of product. The bulk density is approximately 45 lbs. per cubic foot. The pellets are approximately 1-2 mm in diameter (0.040 – 0.080 inches)

Tuscarora Landscaper's Choice is an organic biosolids product meeting the U.S. Environmental Protection Agencies "Exceptional Quality" standards for beneficial use. Apply this product in accordance with label directions. Do not apply in or near any public or private water supplies including wells, streams, or lakes. Do not apply to flooded or frozen land. Store unused product away from children and pets in a cool, dry area.

If you have questions regarding this product, please call the Leesburg Water Pollution Control Facility at 703-737-7100, M-F, 8:00 AM – 5:00 PM.

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
NORTHERN REGIONAL OFFICE
13901 Crown Court, Woodbridge, Virginia 22193
(703) 583-3800 Fax (703) 583-3801
www.deq.virginia.gov

Preston Bryant
Secretary of Natural Resources

David K. Paylor
Director

Thomas A. Faha
Regional Director

May 7, 2008

Mr. Randolph W. Shoemaker
Director of Utilities
Town of Leesburg
25 West Market Street
P.O. Box 88
Leesburg, VA 20178

Re: **Leesburg Water Pollution Control Facility, Permit # MD0066184**

Dear Mr. Shoemaker:

Attached is a copy of the Site Inspection Report generated from the Facility Compliance Inspection conducted at Leesburg Water Pollution Control Facility **(WPCF)** on April 3, 2008. We would like to thank Mr. Steve Cawthron for his time and assistance during this visit.

If you have any questions or comments concerning this report, please feel free to contact me at the Northern Regional Office at (703) 583-3882 or by E-mail at smmack@deq.virginia.gov.

Sincerely,

Sharon Mack

Sharon Mack
Environmental Specialist II

cc: Permits / DMR File
Compliance Manager
Compliance Auditor
Compliance Inspector

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

NORTHERN VIRGINIA REGIONAL OFFICE
13901 CROWN COURT, WOODBRIDGE, VA. 22193
PHONE: (703) 583-3870 FAX: (703) 583-3871

SITE INSPECTION REPORT

FACILITY NAME:	**Town of Leesburg Water Pollution Control Facility**				
PERMIT NUMBER:	**MD0066184**	INSPECTION DATE:	**4/3/08**	REPORT DATE:	**05/07/08**
INSPECTOR:	**Sharon Mack**	REVIEWER		DATE	5/7/08
PRESENT AT INSPECTION:	**Doug Frasier – VA DEQ** **Steve Cawthron – Town of Leesburg**				

Inspection Type:

	Compliance	WL/NOV#:		Announced
	Sampling			Scheduled
X	Other: **Recon**			

Observation Section:

- The purpose of this visit was to tour the plant prior to issuance of a VPDES permit to replace the current Maryland Discharge Permit. Projected issuance date of VA0092282 is August 2008.
- Arrived at 1010; met Steve. Weather- cool and partly cloudy.
- Initial discussion on the facility's expansion construction project and the plant layout.
- 12 operators are employed by WWTF plus 5 or 6 more people who hold licenses but are not operators as their main duties. Staff is generally on site between 7 am and 1 am.
- Toured the plant with Steve. An extensive upgrade/expansion project is in the completion stage and should be finished in the first part of June 2008.
- The original Class B sludge storage pads have been converted into a covered storage area for vehicles and equipment.
- A new generator and power substation have been installed with appropriate containment for the fuel tanks and fuel off-loading area.

Water

- All collection system interceptors and plant drains enter the receiving station
- The influent pump station and pista grit building have odor control systems that utilize biofilters for air treatment.
- There is a new chemical feed building with appropriate containment.
- The old influent pumps are being converted to non-potable water pumps for water reuse on site. The new influent pump station consists of 6 variable speed pumps.
- Screening- two ¾" fine screens are operated in parallel.
- There are three primary clarifiers which are covered for odor control. Primary sludge is sent to the gravity thickeners (covered).
- Effluent enters the Biological Nutrient Removal (BNR) flow splitter boxes (one splitter box for each 2 BNR units)
- The facility has two older BNR units with 0.5 MGD capacity each, and four new units with 90,000 gallon capacity each- six BNR units total. BNRs were being operated as 80% aerobic, 20% anoxic at the time of this inspection; this ratio can be altered according to need. DO is monitored by Foxboro DO meters.
- BNR effluent enters the clarifier splitter box, then 2 new Gould primary clarifiers with 2 sections each. Sludge is pulled from the secondary clarifiers via telescoping valves and pumped to the RAS /WAS splitter station.
- Chlorine is added to the BNR effluent prior to it entering the two sand filters that are operated in parallel. Total Residual Chlorine after the sand filters averages 1.0 mg/L.
- A 1.6 MG emergency tank is on site as well as two aerated emergency storage basins.

Sludge

- Septage is received by the WPCF and may be screened prior to entering the digester.
- Primary sludge is sent to the gravity thickeners (covered). The two gravity thickeners are identified as A or B; thickener A feeds sludge to digester A and then into digester C; thickener B feed sludge into digester B and then into Digester D. After the digesters, sludge sits in one of two holding tanks (1350 thousand gallon capacity each).
- Odor from the holding tank is controlled by a Regenerative Thermal Oxidizer (RTO). Gas from the tank is heated, oxidizing the Volatile Organic Carbons (VOCs) and forming carbon dioxide and water vapor. Heat released in this process is captured and used to heat more gas. Because the heat is recaptured/recycled through the system, temperature of the gas released into the environment is much reduced. The facility has a VA DEQ air permit for this RTO unit.
- There are four underground tanks prior to the solids processing building. One for primary sludge and a small amount of RAS; one for WAS from the RAS /WAS splitter station, and 2 for blending.
- From the tanks, sludge is sent to two gravity belt presses, then to two sludge presses- sludge is at about 20% solids on leaving press. Cake leaving the press is conveyed to a mixer, where it mixes with small, dry pellets, which assists in the drying process. Solids are then triple passed through the heating drum for drying and stabilization. Dried biosolids are either bagged for give away to residents or trucked out for land application.
- The facility's original laboratory is in the current sludge processing building and is used as an auxiliary/solids testing lab.

Effluent Discharge Point

- We traveled with Steve to Outfall 001.
- The plant's outfall was relocated from Tuscarora Creek to the Potomac River as part of the 1995 upgrade/expansion.
- The plant effluent is pumped several miles to the town's water treatment plant, where it is dechlorinated (sodium bisulfite) prior to discharge to the environment. Composite samples are collected at the dechlorination building. Effluent enters the Potomac River approximately 20 yards downstream from Water Treatment Plant intake structure.
- Returned to the office for an exit interview and discussion of possible changes in the permit limits when it is changed from a Maryland discharge permit to a Virginia discharge permit.
- Departed 1330.

PHOTOGRAPH LOG

- Photos were taken by S. Mack
- Photos can be located on the DEQ U drive @ Photos - Water Facilities – Leesburg WWTP – 04-03-08.
- Photos are included with this report.

Compliance Section:

DMR VIOLATION(S): None

INSPECTION VIOLATION(S): None

Sampling Section: NA

Maryland Water Quality Standards

COMAR 26.08.02

.02 Designated Uses.

A. General.

(1) The determination of the designated use of a water body shall include consideration of the following factors:

(a) Existing conditions; and

(b) Potential uses which may be made possible by anticipated improvements in water quality.

(2) The actual uses of surface water are not limited to those designated in this chapter. Any reasonable and lawful use is permitted provided that the surface water quality is not adversely affected by the use.

B. Specific Designated Uses.

(1) Use I: Water Contact Recreation, and Protection of Nontidal Warmwater Aquatic Life. This use designation includes waters that are suitable for:

(a) Water contact sports;

(b) Play and leisure time activities where individuals may come in direct contact with the surface water;

(c) Fishing;

(d) The growth and propagation of fish (other than trout), other aquatic life, and wildlife;

(e) Agricultural water supply; and

(f) Industrial water supply.

(2) Use I-P: Water Contact Recreation, Protection of Aquatic Life, and Public Water Supply. This use designation includes:

(a) All uses identified for Use I; and

(b) Use as a public water supply.

(3) Use II: Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting. This use designation includes all applicable uses identified for Use I in:

(a) All tidally influenced waters of the Chesapeake Bay and tributaries, the Coastal Bays, and the Atlantic Ocean to the 3-mile boundary; and

(b) Tidally influenced waters that are or have the potential for:

(i) Shellfish propagation and storage, or harvest for marketing purposes; and

(ii) Actual or potential areas for the harvesting of oysters, soft-shell clams, hard-shell clams, and brackish water clams.

(4) Use II-P: Tidal Fresh Water Estuary. This use designation includes:

(a) All uses identified for Use II waters; and

(b) Use as a public water supply.

(5) Use III: Nontidal Cold Water. This use designation includes all uses identified for Use I and waters which have the potential for or are:

(a) Suitable for the growth and propagation of trout; and

(b) Capable of supporting self-sustaining trout populations and their associated food organisms.

(6) Use III-P: Nontidal Cold Water and Public Water Supply. This use designation includes:

(a) All uses identified for Use III waters; and

(b) Use as a public water supply.

(7) Use IV: Recreational Trout Waters. This use designation includes all uses identified for Use I in cold or warm waters that have the potential for or are:

(a) Capable of holding or supporting adult trout for put-and-take fishing; and

(b) Managed as a special fishery by periodic stocking and seasonal catching.

(8) Use IV-P: Recreational Trout Waters and Public Water Supply. This use designation includes:

(a) All uses identified for Use IV waters; and

(b) Use as a public water supply.

.03-2 Numerical Criteria for Toxic Substances in Surface Waters.

A. Numerical toxic substance criteria shall be applied:

(1) In intermittent streams, at the end of the discharge pipe; and

(2) In all other water bodies, at the edge of the mixing zones determined in accordance with Regulation .05C—E of this chapter.

B. Acceptable laboratory methods for the detection and measurement of toxic substances shall be specified by the Department.

C. Site-specific numerical toxic substance criteria may be developed on a site-specific basis. A person who wishes to develop a site-specific numerical toxic substance criterion shall:

(1) Do so in accordance with a scientifically defensible methodology approved by the Department; and

(2) Notify the Department of their intent not later than the time specified in COMAR 26.08.04.01-1.

D. The toxicity of certain substances in Tables 1 and 4 of §G of this regulation is increased or decreased by hardness or pH. For these toxic substances:

(1) The Department may:

(a) Require the discharger to provide site-specific measurements; or

(b) Recalculate the aquatic life criteria based on available water quality data.

(2) The permittee may voluntarily provide site-specific information for the recalculation of the criteria. It is within the Department's discretion to determine the weight given this information.

(3) After reviewing the information provided in §D(1) or (2), the Department shall determine if one or more of these criteria should be modified at a particular location.

E. In those cases where numerical toxic substance criteria for aquatic life protection and protection of human health both apply, the most restrictive of the criteria shall be used.

F. Acute and chronic numeric toxic substance criteria for fresh, estuarine, and salt water aquatic life protection and for human health protection are shown in Tables 1—4 of §G. For the instream application of the acute and chronic criteria for the protection of aquatic life in Tables 1—4 of §G of this regulation:

(1) The metals shall be measured as dissolved metal or as biologically available equivalence and may be translated to total recoverable measurements for waste load allocation to derive discharge permit limits using the procedures for the biological translator or chemical translator described in COMAR 26.08.04;

(2) The organic substances shall be measured directly or as biologically available equivalence and may be translated for waste load allocation to derive discharge permit limits using the procedures for the biological translator described in COMAR 26.08.04; and

(3) Cyanide shall be measured as either free cyanide or cyanide amenable to chlorination.

G. Tables of Ambient Water Quality Criteria.

(1) Table 1. Toxic Substances Criteria for Ambient Surface Waters-Inorganic Substances.

Substance	CAS	Aquatic Life (µg/L)						Human Health for Consumption of: (Risk Level = 10^{-5}) (µg/L)	
		Fresh Water		Estuarine Water		Salt Water		Drinking Water + Organism	Organism Only
		Acute	Chronic	Acute	Chronic	Acute	Chronic		
Antimony	7440360							5.6	640
Arsenic[1]	7440382	340	150			69	36	10	41[a]
Asbestos	1332214							7 million fibers/L	
Barium	7440393							2,000	
Beryllium[3]								4	
Cadmium[1, 3]	7440439	2.0	0.25			40	8.8	5	
Chlorine[2]	7782505	19	11			13	7.5		
Chromium (total)	7440473							100	
Chromium III[1]	16065831	570	74						
Chromium VI	18540299	16	11			1100	50		
Copper[1]	7440508	13	9	6.1		4.8	3.1	1,300	
Cyanide	57125	22	5.2			1	1	700	220,000
Lead[1]	7439921	65	2.5			210	8.1		
Mercury	7439976	1.4	0.77			1.8	0.94		
Methylmercury	22967926								0.3 mg/kg
Nickel[1]	7440020	470	52			74	8.2	610	4,600
Selenium	7782492	20	5			290	71	170	4,200
Silver[1]	7440224	3.2				1.9			
Thallium	7440280							1.7	6.3
Zinc[1]	7440666	120	120			90	81	7,400	26,000

[1] Refer to §D of this regulation.

[2]The more stringent of these criteria or the discharge requirements in COMAR 26.08.03.06 shall be used as the basis for determining discharge permit limitations.

[3] The drinking water + organism criterion is the Safe Drinking Water Maximum Contaminant Level.

[a] This criterion will be applied against the actual measurement of inorganic arsenic (As+3) rather than total arsenic.

(2) Table 2. Toxic Substances for Ambient Water Quality Criteria-Organic Compounds.

Substance CAS		Aquatic Life (µg/L)				Human Health for Consumption of: (Risk Level = 10^{-5}) (µg/L)	
		Fresh Water		Salt Water			
		Acute	Chronic	Acute	Chronic	Water + Organism	Organism Only
1,1 Dichloroethylene (DCE)	75354					0.57	32
1,1,1-Trichloroethane (TCA)[2]	71556					200	
1,1,2,2-Tetrachloroethane	79345					1.7	4.0
1,1,2-Trichloroethane	79005					5.9	160
1,2,4-Trichlorobenzene	120821					260	940
1,2-Dichlorobenzene	95501					2,700	17,000
1,2-Dichloroethane	107062					3.8	370
1,2-Dichloropropane	78875					5.0	150
1,2-Diphenylhydrazine	122667					0.36	2.0
1,2-Trans-Dichloroethylene	156605					700	140,000
1,3-Dichlorobenzene	541731					320	960
1,3-Dichloropropene	542756					10	1,700
1,4-Dichlorobenzene	106467					400	2,600
2,4,6-Trichlorophenol	88062					14	24
2,4-Dichlorophenol	120832					77	290
2,4-Dimethylphenol	105679					380	850
2,4-Dinitrophenol	51285					69	5,300
2,4-Dinitrotoluene	121142					1.1	34
2-Chloronapthalene	91587					1,000	1,600
2-Chlorophenol	95578					81	150
2-Methyl-4,6-Dinitrophenol	534521					13	280
3,3'-Dichlorobenzidine	91941					0.21	0.28
Acrolein	107028					190	290
Acrylonitrile	107131					0.51	2.5
Benzene	71432					22	510
Benzidine	92875					0.00086	0.0020
Bis(2-Chloroethyl)Ether	111444					0.30	5.3
Bis2(Chloroisopropyl)Ether	108601					1400	65,000
Bromoform[2]	75252					See Trihalomethanes	1,400
Carbon tetrachloride	56235					2.3	16
Chlorobenzene	108907					680	21,000
Chlorodibromomethane[2]	124481					See Trihalomethanes	130
Chloroform2	67663					See Trihalomethanes	4,700
Dichlorobromomethane2	75274					See Trihalomethanes	170
Ethylbenzene	100414					3,100	29,000

Hexachlorobenzene	118741					0.0028	0.0029
Hexachlorobutadiene	87683					4.4	180
Hexachlorocyclopentadiene	77474					240	17,000
Hexachloroethane	67721					14	33
Isophorone	78591					350	9,600
Methyl bromide	74839					47	1,500
Methylene chloride	75092					46	5,900
Nitrobenzene	98953					17	690
N-Nitrosodimethylamine	62759					0.0069	30
N-Nitrosodi-n-Propylamine	621647					0.050	5.1
N-Nitrosodiphenylamine	86306					33	60
Phenol	108952					21,000	1,700,000
Tetrachloroethylene	127184					6.9	33
Toluene	10883					6,800	200,000
Trichloroethylene (TCE)	79016					25	300
Trihalomethanes[2]						80	
Vinyl chloride	75014					20	5,300

[1] The drinking water + organism criterion is the Safe Drinking Water Maximum Contaminant Level.

[2] Four compounds (bromoform, chlorodibromomethane, chloroform, and dichlorodibromomethane) are found in combination and comprise a category of contaminants called "trihalomethanes" formed as a result of drinking water disinfection. The concentration of any of these compounds individually, or all of them in sum, may not exceed 80 micrograms per liter. This criterion is equal to the Safe Drinking Water Act Maximum Contaminant Level.

(3) Table 3. Toxic Substances for Ambient Water Quality Criteria-Polycyclic Aromatic Hydrocarbons and Phthalates.

Substance CAS		Aquatic Life (µg/L)				Human Health for Consumption of: (Risk Level = 10^{-5}) (µg/L)	
		Fresh Water		Salt Water			
		Acute	Chronic	Acute	Chronic	Water + Organism	Organism Only
Acenaphthene	83329					670	990
Anthracene	120127					8,300	40,000
Benzo(a)Anthracene	56553					0.038	0.18
Benzo(a)Pyrene	50328					0.038	0.18
Benzo(b)Fluoranthene	205992					0.038	0.18
Benzo(k)Fluoranthene	207089					0.038	0.18
Chrysene	218019					0.038	0.18
Dibenzo(a,h)Anthracene	53703					0.038	0.18
Fluoranthene	206440					130	140
Fluorene	86737					1,100	5,300
Ideno 1,2,3-cdPyrene	193395					0.038	0.18
Pyrene	129000					830	4,000
Bis(2-Ethylhexyl) Phthalate	117817					12	22
Butylbenzyl Phthalate	85687					1,500	1,900
Diethyl Phthalate	84662					17,000	44,000
Dimethyl Phthalate	131113					270,000	1,100,000
Di-n-Butyl Phthalate	84742					2,000	4,500

(4) Table 4. Toxic Substances for Ambient Water Quality Criteria-Pesticides and Chlorinated Compounds.

Substance CAS		Aquatic Life (µg/L)				Human Health for Consumption of: (Risk Level = 10^{-5}) (µg/L)	
		Fresh Water		Salt Water			
		Acute	Chronic	Acute	Chronic	Water + Organism	Organism Only
2, 3, 7, 8-TCDD (Dioxin)	1746016					0.00000005	0.00000051
4,4'-DDD	72548					0.0031	0.0031
4,4'-DDE	72559					0.0022	0.0022
4,4'-DDT	50293	1.1	0.001	0.13	0.001	0.0022	0.0022
Aldrin	309002	3		1.3		0.00049	0.00050
Alpha-BHC	319846					0.026	0.049
Alpha-Endosulfan	959988	0.22	0.056	0.034	0.0087	62	89
Atrazine	319857					3	
Beta-BHC	319857					0.091	0.17
Beta-Endosulfan	33213659	0.22	0.056	0.034	0.0087	62	89
Chlordane	57749	2.4	0.0043	0.09	0.004	0.0080	0.0081
Chloropyrifos	2921882	0.083					
Dieldrin	60571	0.24	0.056	0.71	0.0019	0.00052	0.00054
Endosulfan Sulfate	1031078					62	89
Endrin	72208	0.086	0.036	0.037	0.0023	0.76	0.81
Endrin Aldehyde	7421934					0.29	0.30
Gamma-BHC (Lindane)	58899	0.95		0.16		0.19	0.63
Heptachlor	76448	0.52	0.0038	0.053	0.0036	0.00079	0.00079
Heptachlor Epoxide	1024573	0.52	0.0038	0.053	0.0036	0.00039	0.00039
Polychlorinated Biphenyls PCBs			0.014		0.03	0.00064	0.00064
Toxaphene	8001352	0.73	0.0002	0.21	0.0002	0.0028	0.0028
Tributyltin (TBT)		0.46	0.063	0.37	0.010		
Pentachlorophenol (PCP)[1]	87865	19	15	13	7.9	2.7	30

[1] Refer to §D of this regulation.

H. Acute Numeric Toxic Substance Criteria for Ammonia for the Protection of Fresh Water Aquatic Life (Table 1).

(1) Presence of Salmonid Fish. In Use III, III-P, IV, and IV-P waters, the concentration of total ammonia (in milligrams of nitrogen per liter) may not exceed the acute criterion listed under "Salmonids Present" in Table 1.

(2) Absence of Salmonid Fish. In Use I and I-P waters, the concentration of total ammonia (in milligrams of nitrogen per liter) may not exceed the acute criterion listed under "Salmonids Absent" in Table 1.

(3) Table 1. Acute Water Quality Criteria for freshwater Aquatic Life (milligrams of nitrogen per liter).

pH	Salmonids Present[1]	Salmonids Absent[2]
6.5	32.6	48.8
6.6	31.3	46.8
6.7	29.8	44.6
6.8	28.1	42.0
6.9	26.2	39.1
7.0	24.1	36.1
7.1	22.0	32.8
7.2	19.7	29.5
7.3	17.5	26.2
7.4	15.4	23.0
7.5	13.3	19.9
7.6	11.4	17.0
7.7	9.65	14.4
7.8	8.11	12.1
7.9	6.77	10.1
8.0	5.62	8.40
8.1	4.64	6.95
8.2	3.83	5.72
8.3	3.15	4.71
8.4	2.59	3.88
8.5	2.14	3.20
8.6	1.77	2.65
8.7	1.47	2.20
8.8	1.23	1.84
8.9	1.04	1.56
9.0	0.885	1.32

[1] The acute water quality criteria for total ammonia where salmonids may be present was calculated using the following equation, which may also be used to calculate unlisted values: Acute water quality criteria for ammonia (salmonids present) = [0.275/(1+107.204 - pH)]+[39.0/ (1+10pH - 7.204)]

[2] The acute water quality criteria for total ammonia where salmonids are absent were calculated using the following equation, which may also be used to calculate unlisted values: Acute water quality criteria for ammonia (salmonids absent) = [0.411/(1+107.204 - pH)]+[58.4/ (1+10pH - 7.204)]

I. Chronic Numeric Toxic Substance Criteria for Ammonia, Expressed as a 30-day Average, for the Protection of Fresh Water Aquatic Life (Tables 1 and 2).

(1) Averaging Period. The concentration of total ammonia nitrogen (in milligrams of nitrogen per liter) expressed as a 30-day average may not exceed the chronic criterion listed in Tables 1 or 2.

(2) The use of Table 2 requires documentation acceptable to the Department of the absence of fish early life stages.

(3) In addition, the highest 4-day average within the 30-day period may not exceed 21/2 times the chronic criterion.

(4) Table 1. Chronic Ammonia Criteria for Waters Where Freshwater Fish Early Life Stages May Be Present (milligrams of nitrogen per liter).1

	Temperature (°C)									
pH	0	14	16	18	20	22	24	26	28	30
6.5	6.67	6.67	6.06	5.33	4.68	4.12	3.62	3.18	2.80	2.46
6.6	6.57	6.57	5.97	5.25	4.61	4.05	3.56	3.13	2.75	2.42
6.7	6.44	6.44	5.86	5.15	4.52	3.98	3.50	3.07	2.70	2.37
6.8	6.29	6.29	5.72	5.03	4.42	3.89	3.42	3.00	2.64	2.32
6.9	6.12	6.12	5.56	4.89	4.30	3.78	3.32	2.92	2.57	2.25
7.0	5.91	5.91	5.37	4.72	4.15	3.65	3.21	2.82	2.48	2.18
7.1	5.67	5.67	5.15	4.53	3.98	3.50	3.08	2.70	2.38	2.09
7.2	5.39	5.39	4.90	4.31	3.78	3.33	2.92	2.57	2.26	1.99
7.3	5.08	5.08	4.61	4.06	3.57	3.13	2.76	2.42	2.13	1.87
7.4	4.73	4.73	4.30	3.78	3.32	2.92	2.57	2.26	1.98	1.74
7.5	4.36	4.36	3.97	3.49	3.06	2.69	2.37	2.08	1.83	1.61
7.6	3.98	3.98	3.61	3.18	2.79	2.45	2.16	1.90	1.67	1.47
7.7	3.58	3.58	3.25	2.86	2.51	2.21	1.94	1.71	1.50	1.32
7.8	3.18	3.18	2.89	2.54	2.23	1.96	1.73	1.52	1.33	1.17
7.9	2.80	2.80	2.54	2.24	1.96	1.73	1.52	1.33	1.17	1.03
8.0	2.43	2.43	2.21	1.94	1.71	1.50	1.32	1.16	1.02	0.897
8.1	2.10	2.10	1.91	1.68	1.47	1.29	1.14	1.00	0.879	0.773
8.2	1.79	1.79	1.63	1.43	1.26	1.11	0.973	0.855	0.752	0.661
8.3	1.52	1.52	1.39	1.22	1.07	0.941	0.827	0.727	0.639	0.562
8.4	1.29	1.29	1.17	1.03	0.906	0.796	0.700	0.615	0.541	0.475
8.5	1.09	1.09	0.990	0.870	0.765	0.672	0.591	0.520	0.457	0.401
8.6	0.920	0.920	0.836	0.735	0.646	0.568	0.499	0.439	0.386	0.339
8.7	0.778	0.778	0.707	0.622	0.547	0.480	0.422	0.371	0.326	0.287
8.8	0.661	0.661	0.601	0.528	0.464	0.408	0.359	0.315	0.277	0.244
8.9	0.565	0.565	0.513	0.451	0.397	0.349	0.306	0.269	0.237	0.208
9.0	0.486	0.486	0.442	0.389	0.342	0.300	0.264	0.232	0.204	0.179

[1] The freshwater chronic water quality criteria for total ammonia where fish early life stages may be present were calculated using the following equation, which may also be used to calculate unlisted values:

Freshwater chronic water quality criterion for ammonia (fish early life stages present) = [0.0577/(1 + 107.688 - pH)]+[2.487/(1 + 10pH - 7.688)] X MIN(2.85, 1.45 X 100.028 xw(25 - T))

Where MIN indicates the lesser of the two values separated by a comma.

(5) Table 2. Chronic Ammonia Criteria for Waters Where Freshwater Fish Early Life Stages Are Absent (milligrams of nitrogen per liter).1

	Temperature (°C)									
pH	0—7	8	9	10	11	12	13	14	15[2]	16[2]
6.5	10.8	10.1	9.51	8.92	8.36	7.84	7.35	6.89	6.46	6.06
6.6	10.7	9.99	9.37	8.79	8.24	7.72	7.24	6.79	6.36	5.97
6.7	10.5	9.81	9.20	8.62	8.08	7.58	7.11	6.66	6.25	5.86
6.8	10.2	9.58	8.98	8.42	7.90	7.40	6.94	6.51	6.10	5.72
6.9	9.93	9.31	8.73	8.19	7.68	7.20	6.75	6.33	5.93	5.56
7.0	9.60	9.00	8.43	7.91	7.41	6.95	6.52	6.11	5.73	5.37
7.1	9.20	8.63	8.09	7.58	7.11	6.67	6.25	5.86	5.49	5.15
7.2	8.75	8.20	7.69	7.21	6.76	6.34	5.94	5.57	5.22	4.90
7.3	8.24	7.73	7.25	6.79	6.37	5.97	5.60	5.25	4.92	4.61
7.4	7.69	7.21	6.76	6.33	5.94	5.57	5.22	4.89	4.59	4.30
7.5	7.09	6.64	6.23	5.84	5.48	5.13	4.81	4.51	4.23	3.97
7.6	6.46	6.05	5.67	5.32	4.99	4.68	4.38	4.11	3.85	3.61
7.7	5.81	5.45	5.11	4.79	4.49	4.21	3.95	3.70	3.47	3.25
7.8	5.17	4.84	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89
7.9	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89	2.71	2.54
8.0	3.95	3.70	3.47	3.26	3.05	2.86	2.68	2.52	2.36	2.21
8.1	3.41	3.19	2.99	2.81	2.63	2.47	2.31	2.17	2.03	1.91
8.2	2.91	2.73	2.56	2.40	2.25	2.11	1.98	1.85	1.74	1.63
8.3	2.47	2.32	2.18	2.04	1.91	1.79	1.68	1.58	1.48	1.39
8.4	2.09	1.96	1.84	1.73	1.62	1.52	1.42	1.33	1.25	1.17
8.5	1.77	1.66	1.55	1.46	1.37	1.28	1.20	1.13	1.06	0.990
8.6	1.49	1.40	1.31	1.23	1.15	1.08	1.01	0.951	0.892	0.836
8.7	1.26	1.18	1.11	1.04	0.976	0.915	0.858	0.805	0.754	0.707
8.8	1.07	1.01	0.944	0.885	0.829	0.778	0.729	0.684	0.641	0.601
8.9	0.917	0.860	0.806	0.756	0.709	0.664	0.623	0.584	0.548	0.513
9.0	0.790	0.740	0.694	0.651	0.610	0.572	0.536	0.503	0.471	0.442

[1]The freshwater chronic water quality criteria for total ammonia where fish early life stages are absent were calculated using the following equation, which may also be used to calculate unlisted values:

Freshwater chronic water quality criterion for ammonia (fish early life stages absent) = [0.0577/(1 + 107.688 - pH)] + [2.487/(1 + 10pH - 7.688)] x 1.45 x 100.028 \x (25 - MAX(T,7))

Where MAX indicates the greater of the two values separated by a comma.

[2]At 15°C and above, the criterion for fish early life stage absent is the same as the criterion for fish early life stage present.

J. Saltwater and Estuarine Acute Criteria for Ammonia. Acute numeric toxic substance criteria for ammonia to protect marine and estuarine life are shown in Table 1. In estuarine and saltwaters, the concentration of total ammonia (in milligrams/liter) may not exceed the acute criterion listed in Table 1. Milligrams per liter total ammonia in saltwater (Table 1) may be converted to milligrams of ammonia nitrogen per liter (as used in §§H and I of this regulation) by multiplying the criteria values in Table 1 by 14/17 (or 0.82353) to result in total ammonia nitrogen.

Table 1 Acute Water Quality Criteria for Saltwater Aquatic Life (milligrams per liter total ammonia).

Temperature (°C)								
	0	5	10	15	20	25	30	35
pH	Salinity = 10 parts per thousand							
7.0	270	191	131	92	62	44	29	21
7.2	175	121	83	58	40	27	19	13
7.4	110	77	52	35	25	17	12	8.3
7.6	69	48	33	23	16	11	7.7	5.6
7.8	44	31	21	15	10	7.1	5.0	3.5
8.0	27	19	13	9.4	6.4	4.6	3.1	2.3
8.2	18	12	8.5	5.8	4.2	2.9	2.1	1.5
8.4	11	7.9	5.4	3.7	2.7	1.9	1.4	1.0
8.6	7.3	5.0	3.5	2.5	1.8	1.3	0.98	0.75
8.8	4.6	3.3	2.3	1.7	1.2	0.92	0.71	0.56
9.0	2.9	2.1	1.5	1.1	0.85	0.67	0.52	0.44
pH	Salinity = 20 parts per thousand							
7.0	291	200	137	96	64	44	31	21
7.2	183	125	87	60	42	29	20	14
7.4	116	79	54	37	27	18	12	8.7
7.6	73	50	35	23	17	11	7.9	5.6
7.8	46	31	23	15	11	7.5	5.2	3.5
8.0	29	20	14	9.8	6.7	4.8	3.3	2.3
8.2	19	13	8.9	6.2	4.4	3.1	2.1	1.6
8.4	12	8.1	5.6	4.0	2.9	2.0	1.5	1.1
8.6	7.5	5.2	3.7	2.7	1.9	1.4	1.0	0.77
8.8	4.8	3.3	2.5	1.7	1.3	0.94	0.73	0.56
9.0	3.1	2.3	1.6	1.2	0.87	0.69	0.54	0.44
pH	Salinity = 30 parts per thousand							
7.0	312	208	148	102	71	48	33	23
7.2	196	135	94	64	44	31	21	15
7.4	125	85	58	40	27	19	13	9.4
7.6	79	54	37	25	21	12	8.5	6.0
7.8	50	33	23	16	11	7.9	5.4	3.7
8.0	31	21	15	10	7.3	5.0	3.5	2.5
8.2	20	14	9.6	6.7	4.6	3.3	2.3	1.7
8.4	12.7	8.7	6.0	4.2	2.9	2.1	1.6	1.1
8.6	8.1	5.6	4.0	2.7	2.0	1.4	1.1	0.81
8.8	5.2	3.5	2.5	1.8	1.3	1.0	0.75	0.58
9.0	3.3	2.3	1.7	1.2	0.94	0.71	0.56	0.46

K. Saltwater and Estuarine Chronic Criteria for Ammonia.

(1) Chronic numeric toxic substance criteria for ammonia to protect marine and estuarine life are shown in Table 1.

(2) Averaging Period. The concentration of total ammonia (in milligrams/liter) expressed as a 30-day average may not exceed the chronic criterion listed in Table 1.

(3) Milligrams per liter total ammonia in saltwater (Table 1) may be converted to milligrams of ammonia nitrogen per liter (as used in §§H and I of this regulation) by multiplying the criteria values in Table 1 by 14/17 (or 0.82353) to result in total ammonia nitrogen.

Table 1 Chronic Water Quality Criteria for Saltwater Aquatic Life (milligrams/liter total ammonia).

Temperature (°C)								
	0	5	10	15	20	25	30	35
pH	Salinity = 10 parts per thousand							
7.0	41	29	20	14	9.4	6.6	4.4	3.1
7.2	26	18	12	8.7	5.9	4.1	2.8	2.0
7.4	17	12	7.8	5.3	3.7	2.6	1.8	1.2
7.6	10	7.2	5.0	3.4	2.4	1.7	1.2	0.84
7.8	6.6	4.7	3.1	2.2	1.5	1.1	0.75	0.53
8.0	4.1	2.9	2.0	1.40	0.97	0.69	0.47	0.34
8.2	2.7	1.8	1.3	0.87	0.62	0.44	0.31	0.23
8.4	1.7	1.2	0.81	0.56	0.41	0.29	0.21	0.16
8.6	1.1	0.75	0.53	0.37	0.27	0.20	0.15	0.11
8.8	0.69	0.50	0.34	0.25	0.18	0.14	0.11	0.08
9.0	0.44	0.31	0.23	0.17	0.13	0.10	0.08	0.07
pH	Salinity = 20 parts per thousand							
7.0	44	30	21	14	9.7	6.6	4.7	3.1
7.2	27	19	13	9.0	602	4.4	3.0	2.1
7.4	18	12	8.1	5.6	4.1	2.7	1.9	1.3
7.6	11	7.5	5.3	3.4	2.5	1.7	1.2	0.84
7.8	6.9	4.7	3.4	2.3	1.6	1.1	0.78	0.53
8.0	4.4	3.0	2.1	1.5	1.0	0.72	0.50	0.34
8.2	2.8	1.9	1.3	0.94	0.66	0.47	0.31	0.24
8.4	1.8	1.2	0.84	0.59	0.44	0.30	0.22	0.16
8.6	1.1	0.78	0.56	0.41	0.28	0.20	0.15	0.12
8.8	0.72	0.50	0.37	0.26	0.19	0.14	0.11	0.08
9.0	0.47	0.34	0.24	0.18	0.13	0.10	0.08	0.07
pH	Salinity = 30 parts per thousand							
7.0	47	31	22	15	11	7.2	5.0	3.4
7.2	29	20	14	9.7	6.6	4.7	3.1	2.2
7.4	19	13	8.7	5.9	4.1	2.9	2.0	1.4
7.6	12	8.1	5.6	3.7	3.1	1.8	1.3	0.90
7.8	7.5	5.0	3.4	2.4	1.7	1.2	0.81	0.56
8.0	4.7	3.1	2.2	1.6	1.1	0.75	0.53	0.37
8.2	3.0	2.1	1.4	1.0	0.69	0.50	0.34	0.25
8.4	1.9	1.3	0.90	0.62	0.44	0.31	0.23	0.17
8.6	1.2	0.84	0.59	0.41	0.30	0.22	0.16	0.12
8.8	0.78	0.53	0.37	0.27	0.20	0.15	0.11	0.09
9.0	0.50	0.34	0.26	0.19	0.14	0.11	0.08	0.07

.03-3 Water Quality Criteria Specific to Designated Uses.

A. Criteria for Use I Waters—Water Contact Recreation and Protection of Nontidal Warmwater Aquatic Life.

(1) Bacteriological.

(a) Table 1. Bacteria Indicator Criteria for Frequency of Use.

Steady State Geometric Mean Indicator Density		Single Sample Maximum Allowable Density			
Indicator	All Areas	Frequent Full Body Contact Recreation (Upper 75% CL)	Moderately Frequent Full Body Contact Recreation (Upper 82% CL)	Occasional Full Body Contact Recreation (Upper 90% CL)	Infrequent Full Body Contact Recreation (Upper 95% CL)
Freshwater (Either apply)					
Enterococci	33	61	78	107	151
E. coli	126	235	298	410	576
Marine water					
Enterococci	35	104	158	275	500

CL = confidence level

All numbers are counts per 100 milliliters

(b) In freshwater for E. coli, the following formula is used to calculate the upper 75 percent confidence interval for single sample maximum allowable density: antilog[(log 126) + 0.675 * log(SD)].

(c) In freshwater for enterococci, the following formula is used to calculate the upper 75 percent confidence interval for single sample maximum allowable density: antilog[(log 33) + 0.675 * log(SD)], where log(SD) is the standard deviation of the log transformed E. coli or enterococci data. If the site data are insufficient to establish a log standard deviation, then 0.4 is used as the log standard deviation for both indicators. At the default log standard deviation, the values are 235 for E. coli and 61 for enterococci.

(d) In saltwater, for enterococci, the following formula is used to calculate the upper 75 percent confidence interval for single sample maximum allowable density: antilog[(log 35) + 0.675 * log(SD)], where log(SD) is the standard deviation of the log transformed enterococci data. If the site data are insufficient to establish a log standard deviation, then 0.7 is used as the log standard deviation. At the default log standard deviation, the value is 104.

(e) Confidence Level Factors.

(i) The factors in Table 2 are used in the formulas in this subsection to calculate the appropriate confidence limits when site-specific standard deviations are used.

(ii) Table 2.

Confidence Level	Factor
75%	0.675
82%	0.935
90%	1.280
95%	1.650

(f) Establishment of a Site-Specific Standard Deviation. A site-specific standard deviation for use in the formulas in this subsection shall be based on at least 30 samples, taken over not more than one recreational season, at base flows.

(g) When a sanitary survey and an epidemiological study approved by the Department disclose no significant health hazard, the criteria in Table 1 do not apply.

(2) Dissolved Oxygen. The dissolved oxygen concentration may not be less than 5 milligrams/liter at any time.

(3) Temperature.

(a) The maximum temperature outside the mixing zone determined in accordance with Regulation .05 of this chapter or COMAR 26.08.03.03 —.05 may not exceed 90°F (32°C) or the ambient temperature of the surface surface waters, whichever is greater.

(b) A thermal barrier that adversely affects aquatic life may not be established.

(c) Ambient temperature is the water temperature that is not impacted by a point source discharge.

(d) Ambient temperature shall be measured in areas of the stream representative of typical or average conditions of the stream segment in question.

(e) The Department may determine specific temperature measurement methods, times, and locations.

(4) pH. Normal pH values may not be less than 6.5 or greater than 8.5.

(5) Turbidity.

(a) Turbidity may not exceed levels detrimental to aquatic life.

(b) Turbidity in the surface water resulting from any discharge may not exceed 150 units at any time or 50 units as a monthly average. Units shall be measured in Nephelometer Turbidity Units.

(6) Color. Color in the surface water may not exceed 75 units as a monthly average. Units shall be measured in Platinum Cobalt Units.

(7) Toxic Substance Criteria. All toxic substance criteria to protect:

(a) Fresh water aquatic organisms apply in waters designated as fresh water in Regulation .03-1B;

(b) Estuarine or salt water aquatic organisms apply in waters designated as estuarine or salt waters as specified in Regulation .03-1B; and

(c) The wholesomeness of fish for human consumption apply in fresh, estuarine, and salt waters.

B. Criteria for Subcategory Use I-P Waters—Water Contact Recreation, Protection of Nontidal Warmwater Aquatic Life and Public Water Supply. The following criteria apply:

(1) The criteria for Use I waters in §A(1)—(5); and

(2) Toxic Substance Criteria. All toxic substance criteria:

(a) For protection of fresh water aquatic organisms apply; and

(b) To protect public water supplies and the wholesomeness of fish for human consumption apply.

C. Criteria for Use II Waters—Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting.

(1) Bacteriological Criteria. These criteria are the same as for Use I, criteria for protection of recreational use, except, in Shellfish Harvest Waters, the following criteria also apply. In Shellfish Harvest waters, there may not be any pathogenic or harmful organisms in sufficient quantities to constitute a public health hazard in the use of waters for shellfish harvesting. A public health hazard for the consumption of raw shellfish will be presumed:

(a) If the most probable number (MPN) of fecal coliform organisms exceeds a median concentration of 14 MPN per 100 milliliters;

(b) If more than 10 percent of samples taken exceed 43 MPN per 100 milliliters for a 5-tube decimal dilution test or 49 per 100 milliliters for a 3-tube decimal dilution test; or

(c) Except when a sanitary survey approved by the Department of the Environment discloses no significant health hazard, §C(1)(a) and (b) do not apply and a public health hazard from the consumption of shellfish will not be presumed.

(2) Classification of Use II Waters for Harvesting.

(a) Approved classification means that the median fecal coliform MPN of at least 30 water sample results taken over a 3-year period to incorporate inter-annual variability does not exceed 14 per 100 milliliters; and:

(i) In areas affected by point source discharges, not more than 10 percent of the samples exceed an MPN of 43 per 100 milliliters for a five tube decimal dilution test or 49 MPN per 100 milliliters for a three tube decimal dilution test; or

(ii) In other areas, the 90th percentile of water sample results does not exceed an MPN of 43 per 100 milliliters for a five tube decimal dilution test or 49 MPN per 100 milliliters for a three tube decimal dilution test.

(b) Conditionally approved classification means that the Department has determined that under certain conditions an area is restricted, but when not restricted, meets the conditions for the approved classification.

(c) Restricted classification means that the median fecal coliform MPN of at least 30 water sample results taken over a 3-year period does not exceed 88 per 100 milliliters or that the Department has determined that a public health hazard exists; and:

(i) In areas affected by point source discharges, not more than 10 percent of the samples exceed an MPN of 260 per 100 milliliters for a five tube decimal dilution test or 300 MPN per 100 milliliters for a three tube decimal dilution test; or

(ii) In other areas, the 90th percentile of water sample results does not exceed an MPN of 260 per 100 milliliters for a five tube decimal dilution test or 300 MPN per 100 milliliter for a three tube decimal dilution test.

(d) Prohibited classification means that the fecal coliform values exceed those required for the restricted classification or is an area designated by the Department as a closed safety zone adjacent to a sewage treatment facility outfall or is an area closed due to a known pollution source.

(3) Temperature—same as Use I waters.

(4) pH—same as Use I waters.

(5) Turbidity—same as Use I waters.

(6) Color—same as Use I waters.

(7) Toxic Substance Criteria. All toxic substance criteria to protect:

(a) Estuarine or salt water aquatic organisms apply in accordance with the requirements of Regulation .03-1B; and

(b) The wholesomeness of fish for human consumption apply.

(8) Dissolved Oxygen Criteria for Use II Waters.

(a) This criteria is the same as for Use I waters, except for the Chesapeake Bay mainstem and associated tidal tributary subcategories.

(b) Seasonal and Migratory Fish Spawning and Nursery Subcategory. The dissolved oxygen concentrations in areas designated as migratory spawning and nursery seasonal use shall be:

(i) Greater than or equal to 6 milligrams/liter for a 7-day averaging period from February 1 through May 31;

(ii) Greater than or equal to 5 milligrams/liter as an instantaneous minimum from February 1 through May 31; and

(iii) Applicable to the open-water fish and shellfish subcategory criteria from June 1 to January 31.

(c) The seasonal shallow-water submerged aquatic vegetation subcategory is the same as for the open-water fish and shellfish subcategory year-round.

(d) Open-Water Fish and Shellfish Subcategory. The dissolved oxygen concentrations in areas designated as open-water fish and shellfish subcategory shall be:

(i) Greater than or equal to 5.5 milligrams/liter for a 30-day averaging period year-round in tidal fresh waters (salinity less than or equal to 0.5 parts per thousand);

(ii) Greater than or equal to 5 milligrams/liter for a 30-day averaging period year-round (salinity greater than 0.5 parts per thousand);

(iii) Greater than or equal to 4.0 milligrams/liter for a 7-day averaging period year-round;

(iv) Greater than or equal to 3.2 milligrams/liter as an instantaneous minimum year-round; and

(v) For protection of the endangered shortnose sturgeon, greater than or equal to 4.3 milligrams/liter as an instantaneous minimum at water column temperatures greater than 29°C (77°F).

(e) Seasonal Deep-Water Fish and Shellfish Subcategory. The dissolved oxygen concentrations in areas designated as seasonal deep-water fish and shellfish subcategory shall be:

(i) Greater than or equal to 3.0 milligrams/liter for a 30-day averaging period from June 1 through September 30;

(ii) Greater than or equal to 2.3 milligrams/liter for a 1-day averaging period from June 1 through September 30;

(iii) Greater than or equal to 1.7 milligrams/liter as an instantaneous minimum from June 1 through September 30;

(iv) The open-water fish and shellfish subcategory criteria apply from October 1 to May 31;

(v) For the dissolved oxygen criteria restoration variance for Chesapeake Bay Mainstem Segment 4 mesohaline (CB4MH) seasonal deep-water fish and shellfish subcategory, not lower for dissolved oxygen in segment CB4MH than the stated criteria for the seasonal deep-water seasonal fish and shellfish use for more than 7 percent spatially and temporally (in combination), from June 1 to September 30; and

(vi) For dissolved oxygen criteria restoration variance for Patapsco River mesohaline (PATMH) seasonal deep-water fish and shellfish subcategory, not lower for dissolved oxygen in segment PATMH than the stated criteria for the deep-water seasonal fish and shellfish use for more than 7 percent spatially and temporally (in combination), from June 1 to September 30.

(f) Seasonal Deep-Channel Refuge Subcategory. The dissolved oxygen concentrations in areas designated as deep-channel seasonal refuge use shall be:

(i) Greater than or equal to 1.0 milligrams/liter as an instantaneous minimum from June 1 through September 30 except for Chesapeake Bay segments subject to variances;

(ii) For dissolved oxygen criteria restoration variance for Chesapeake Bay Mainstem Segment 4 mesohaline (CB4MH) deep-channel refuge subcategory, not lower for dissolved oxygen in segment CB4MH than the stated criteria for the seasonal deep-channel refuge for more than 2 percent spatially or temporally (in combination), from June 1 to September 30; and

(iii) The same as for the open-water fish and shellfish subcategory from October 1 to May 31.

(g) Implementation of the Dissolved Oxygen Water Quality Standard. The attainment of the dissolved oxygen criteria that apply to the Chesapeake Bay and tidally influenced tributary waters shall be determined consistent with the guidelines established in the 2003 U.S. Environmental Protection Agency publication "Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll a for the Chesapeake Bay and its Tidal Tributaries (EPA 903-R-03-002)" and the "Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll a for the Chesapeake Bay and its Tidal Tributaries—2004 Addendum (EPA 903-R-04-005)" which are incorporated by reference.

(h) Restoration Variance. The percentage of allowable exceedance for restoration variances is based on water quality modeling and incorporates the best available data and assumptions. The restoration variances are temporary, and will be reviewed at a minimum every three years, as required by the Clean Water Act and EPA regulations. The variances may be modified based on new data or assumptions incorporated into the water quality model.

(9) Water Clarity Criteria for Seasonal Shallow-Water Submerged Aquatic Vegetation Subcategory.

(a) Water Clarity Criteria Measurement. The attainment of the water clarity criteria for a given Bay segment can be determined using any of the following methods:

(i) Shallow-water acreage meets or exceeds the percent-light-through-water (PLW) criteria expressed in Secchi depth equivalence (Table 1) at the segment specific application depth specified in Regulation .08 of this chapter (excludes no grow zones);

(ii) Submerged aquatic vegetation (SAV) acreage meets or exceeds the acreage restoration goal (Table 2); or

(iii) Shallow-water acreage meeting or exceeding the Secchi depth requirements in combination with actual SAV acreage equal or exceed the SAV restoration goal acreage.

(b) Table 1. Numerical Water Clarity Criteria (in Secchi Depth Equivalents) for General Application to Shallow Water Aquatic Vegetation Bay Grass Designated Use (Application Depths Given in 0.5 Meter Attainment Intervals[1]).

		Water Clarity Criteria as Secchi Depth (meters)				
Salinity Regime	Water Clarity Criteria as Percent Light through Water	Water Clarity Criteria Application Depths (meters)				Seasonal Application
		0.5	1.0	1.5	2.0	
		Secchi Depth Equivalents for Criteria Application Depth				
Tidal Fresh	13%	0.4	0.7	1.1	1.4	Apri1 1 to October 1
Oligohaline	13%	0.4	0.7	1.1	1.4	Apri1 1 to October 1
Mesohaline	22%	0.5	1.0	1.4	1.9	Apri1 1 to October 1

[1]Based on application f the formula $PLW = 100\exp(-K_dZ)$, the appropriate PLW criterion value and the selected application depth (Z) are inserted and the equation is solved for K_d. The generated K_d value is then converted to Secchi depth (in meters) using the conversion factor $K_d = 1.45/\text{Secchi depth}$.

(c) Table 2. SAV Acreage Restoration Goals.

Segment Description[1]	Segment Designator	SAV Acreage Restoration Goal	Secchi Application Depth
Northern Chesapeake Bay	CB1TF2	12,149	2 meters
Northern Chesapeake Bay	CB1TF1	754	1.0 meters
Lower Pocomoke River Mesohaline	POCMH	877[2]	1.0 meters
Manokin River Mesohaline	MANMH1	4,294	2.0 meters
Manokin River Mesohaline	MANMH2	59	0.5 meters
Big Annemessex River Mesohaline	BIGMH1	2,021	2.0 meters
Big Annemessex River Mesohaline	BIGMH2	22	0.5 meters
Tangier Sound Mesohaline	TANMH1	24,683[2]	2.0 meters

Tangier Sound Mesohaline	TANMH2	74	0.5 meters
Middle Nanticoke River Oligohaline	NANOH	12	0.5 meters
Lower Nanticoke River Mesohaline	NANMH	3	0.5 meters
Wicomico River Mesohaline	WICMH	3	0.5 meters
Fishing Bay Mesohaline	FSBMH	197	0.5 meters
Middle Choptank River Oligohaline	CHOOH	72	0.5 meters
Lower Choptank River Mesohaline	CHOMH2	1,621	1.0 meters
Mouth of Choptank River Mesohaline	CHOMH1	8,184	2.0 meters
Little Choptank River Mesohaline	LCHMH	4,076	2.0 meters
Honga River Mesohaline	HNGMH	7,761	2.0 meters
Eastern Bay	EASMH	6,209	2.0 meters
Middle Chester River Oligohaline	CHSOH	77	0.5 meters
Lower Chester River Mesohaline	CHSMH	2,928	1.0 meters
Chesapeake & Delaware (C&D) Canal	C&DOH	7	0.5 meters
Northeast River Tidal Fresh	NORTF	89	0.5 meters
Bohemia River Oligohaline	BOHOH	354	0.5 meters
Elk River Oligohaline	ELKOH1	1,844	2.0 meters
Elk River Oligohaline	ELKOH2	190	0.5 meters
Sassafras River Oligohaline	SASOH1	1,073	2.0 meters
Sassafras River Oligohaline	SASOH2	95	0.5 meters
Bush River Oligohaline	BSHOH	350	0.5 meters
Gunpowder River Oligohaline	GUNOH2	572	2.0 meters
Mouth of Gunpowder River	GUNOH1	1,860	0.5 meters
Middle River Oligohaline	MIDOH	879	2.0 meters
Patapsco River Mesohaline	PATMH	389	1.0 meters
Magothy River Mesohaline	MAGMH	579	1.0 meters
Severn River Mesohaline	SEVMH	455	1.0 meters
South River Mesohaline	SOUMH	479	1.0 meters
Rhode River Mesohaline	RHDMH	60	0.5 meters
West River Mesohaline	WSTMH	238	0.5 meters
Upper Patuxent River Tidal Fresh	PAXTF	205	0.5 meters
Middle Patuxent River Oligohaline	PAXOH	115	0.5 meters
Lower Patuxent River Mesohaline	PAXMH1	1,459	2.0 meters
Lower Patuxent River Mesohaline	PAXMH2	172	0.5 meters
Lower Patuxent River Mesohaline	PAXMH4	1	0.5 meters
Lower Patuxent River Mesohaline	PAXMH5	2	0.5 meters
Lower Potomac River Tidal Fresh	POTTF	2,142[2]	2.0 meters
Piscataway Creek Tidal Fresh	PISTF	789	2.0 meters
Mattawoman Creek Tidal Fresh	MATTF	792	1.0 meters
Lower Potomac River Oligohaline	POTOH1	1,387[2]	2.0 meters
Lower Potomac River Oligohaline	POTOH2	262	1.0 meters
Lower Potomac River Oligohaline	POTOH3	1,153	1.0 meters
Lower Potomac River Mesohaline	POTMH	7,088[2]	1.0 meters
Upper Chesapeake Bay	CB2OH	705	0.5 meters
Upper Central Chesapeake Bay	CB3MH	1,370	0.5 meters

Middle Central Chesapeake Bay	CB4MH	2,533	2.0 meters
Lower Central Chesapeake Bay	CB5MH	8,270[2]	2.0 meters

[1] The segments Middle Pocomoke Oligohaline (POCOH-application depth = 0.5 meters), Upper Chester River Tidal Fresh (CHSTP-application depth = 0.5 meters), Back River Oligohaline (BACOH-application depth = 0.5 meters), and West Branch Patuxent River (WBRTF-application depth = 0.5 meters), and Lower Patuxent River Mesohaline Subsegments 3 and 6 (PAXMH3 & PAXMH6-application depths = 0.5 meters), and the Anacostia River Tidal Fresh (ANATF-application depth = 0.5 meters) are not listed above because the SAV Restoration goal for each segment is 0 acres, based on the required historical SAV presence criteria used to set the restoration goal for each segment. These segments have been assigned a water clarity criteria and application depth. Attainment of the shallow-water designated use will be determined using the method outlined in §C(9)(a)(i)—(iii) and (c) of this regulation.

[2]Maryland portion of the segment.

(d) SAV No Grow Zones. Certain Chesapeake Bay segments contain areas designated as shallow water use that are not suitable for growth of submerged aquatic vegetation due to natural conditions. Figures V-1 to V-12 of the "Technical Support Document for Identification of Chesapeake Bay Designated Uses and Attainability (EPA 903-R-04-006)" which is incorporated by reference, indicate the SAV No Grow Zones.

(e) Implementation. The attainment of the water clarity criteria that apply to the seasonal shallow-water submerged aquatic vegetation use subcategory in the Chesapeake Bay and tidally influenced tributary waters will be determined consistent with the guidelines documented within the 2003 U.S. Environmental Protection Agency publication "Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll a for the Chesapeake Bay and its Tidal Tributaries (EPA 903-R-04-005)", the "Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll a for the Chesapeake Bay and its Tidal Tributaries-2004 Addendum (EPA 903-R-04-005)", and the Technical Support Document for Identification of Chesapeake Bay Designated Uses and Attainability-2004 Addendum (EPA 903-R-04-006) which are incorporated by reference.

(10) Chlorophyll a. Concentrations of chlorophyll a in free-floating microscopic aquatic plants (algae) may not exceed levels that result in ecologically undesirable consequences that would render tidal waters unsuitable for designated uses.

(11) Compliance Schedules for Protection of Downstream Uses in Tidal Waters.

(a) The compliance schedule provisions of COMAR 26.08.04.02C are applicable to discharge permits issued to existing dischargers which contain new or revised effluent limitations based on water quality standards contained in §C(8) and (9) of this regulation.

(b) An upstream state issuing discharge permits to existing dischargers which contain new or revised effluent limitations based on the water quality standards contained in §C(8) and (9) of this regulation may apply the compliance schedule provisions of COMAR 26.08.04.02C.

C-1. Criteria for Use II-P Waters—Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting and Public Water Supplies. The following criteria apply:

(1) The criteria for Use II waters in §C(1)—(8), (9)(a)—(c), (10), and (11); and

(2) All toxic substance criteria:

(a) For protection of fresh water and freshwater-adapted estuarine aquatic organisms apply; and

(b) To protect public water supplies and the wholesomeness of fish and shellfish for human consumption.

D. Criteria for Use III Waters—Nontidal Cold Water.

(1) Bacteriological—same as Use I waters.

(2) Dissolved Oxygen. The dissolved oxygen concentration may not be less than 5 milligrams/liter at any time, with a minimum daily average of not less than 6 milligrams/liter.

(3) Temperature.

(a) The maximum temperature outside the mixing zone determined in accordance with Regulation .05 of this chapter or COMAR 26.08.03.03—.05 may not exceed 68?F (20?C) or the ambient temperature of the surface waters, whichever is greater.

(b) Ambient temperature—Same as Use I.

(c) A thermal barrier that adversely affects salmonid fish may not be established.

(d) It is the policy of the State that riparian forest buffer adjacent to Use III waters shall be retained whenever possible to maintain the temperatures essential to meeting this criterion.

(4) pH—same as Use I waters.

(5) Turbidity—same as Use I waters.

(6) Color—Same as Use I waters.

(7) Total Residual Chlorine (TRC). Except as provided in COMAR 26.08.03.06, the Department may not issue a permit allowing the use of chlorine or chlorine-containing compounds in the treatment of wastewaters discharging to Use III and Use III-P waters.

(8) Toxic Substance Criteria. All toxic substance criteria to protect:

(a) Fresh water aquatic organisms apply; and

(b) The wholesomeness of fish for human consumption apply.

E. Criteria for Use III-P Waters—Nontidal Cold Water and Public Water Supplies.

(1) Exception. Authorized operation of the Little Seneca Creek Dam means that all operational activities permitted are met under the conditions of a dam operating permit issued by the Department of Natural Resources under Natural Resources Article, §§8-801—8-814, Annotated Code of Maryland, and COMAR 08.05.03. Injury resulting from the authorized operation of Little Seneca Creek Dam to the Use III natural trout fishery recognized in the stream use designation assigned to Little Seneca Creek in Regulation .08 of this chapter is not considered a violation of this chapter.

(2) The following criteria apply:

(a) The criteria for Use III waters in §D(1)—(7); and

(b) All toxic substance criteria to protect:

(i) Fresh water aquatic organisms, and

(ii) Public water supplies and the wholesomeness of fish for human consumption.

F. Criteria for Use IV Waters—Recreational Trout Waters.

(1) Bacteriological—same as Use I waters.

(2) Dissolved oxygen—same as Use I waters.

(3) Temperature.

(a) The maximum temperature outside the mixing zone determined in accordance with Regulation .05 of this chapter or COMAR 26.08.03.03—.05 may not exceed 75°F (23.9°C) or the ambient temperature of the surface waters, whichever is greater.

(b) Ambient temperature—Same as Use I.

(c) A thermal barrier that adversely affects salmonid fish may not be established.

(d) It is the policy of the State that riparian forest buffer adjacent to Use IV waters shall be retained whenever possible to maintain the temperatures essential to meeting this criterion.

(4) pH—same as Use I waters.

(5) Turbidity—same as Use I waters.

(6) Color—same as for Use I waters.

(7) Toxic Substance Criteria. All toxic substance criteria to protect:

(a) Fresh water aquatic organisms apply; and

(b) The wholesomeness of fish for human consumption apply.

G. Criteria for Use IV-P Waters—Recreational Trout Waters and Public Water Supplies. The following criteria apply:

(1) The criteria for Use IV waters in §F(1)—(6); and

(2) Toxic Substance Criteria. All toxic substance criteria to protect:

(a) Fresh water aquatic organisms, and

(b) Public water supplies and the wholesomeness of fish for human consumption.

STATE WATER CONTROL BOARD

9 VAC 25-260 Virginia Water Quality Standards.

Statutory Authority: § 62.1-44.15 3a of the Code of Virginia.

WITH AMENDMENTS EFFECTIVE September 11, 2007

PART I

SURFACE WATER STANDARDS WITH GENERAL, STATEWIDE APPLICATION

9 VAC 25-260-5. Definitions.

The following words and terms when used in this chapter shall have the following meanings unless the context clearly indicates otherwise:

“Algicides” means chemical substances, most commonly copper-based, used as a treatment method to control algae growths.

"Board" means State Water Control Board.

"Chesapeake Bay and its tidal tributaries" means all tidally influenced waters of the Chesapeake Bay, western and eastern coastal embayments and tributaries, James, York, Rappahannock and Potomac Rivers and all their tidal tributaries to the end of tidal waters in each tributary (in larger rivers this is the fall line); and includes subdivisions 1, 2, 3, 4, 5, and 6 of 9 VAC 25-260-390, subdivisions 1, 1b, 1d, 1f and 1o of 9 VAC 25-260-410, subdivisions 5 and 5a of 9 VAC 25-260-415, subdivisions 1 and 1a of 9 VAC 25-260-440, subdivisions 2, 3, 3a, 3b and 3e of 9 VAC 25-260-520, and subdivision 1 of 9 VAC 25-260-530. This definition does not include free flowing sections of these waters.

"Criteria" means elements of the board's water quality standards, expressed as constituent concentrations, levels, or narrative statements, representing a quality of water that supports a particular use. When criteria are met, water quality will generally protect the designated use.

"Designated uses" means those uses specified in water quality standards for each water body or segment whether or not they are being attained.

"Drifting organisms" means planktonic organisms that are dependent on the current of the water for movement.

"Existing uses" means those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards.

“Lacustrine” means the zone within a lake or reservoir that corresponds to nonflowing lake-like conditions such as those near the dam. The other two zones within a reservoir are riverine (flowing, river-like conditions) and transitional (transition from river to lake conditions*).*

“Man-made lake or reservoir” means a constructed impoundment.

"Mixing zone" means a limited area or volume of water where initial dilution of a discharge takes place and where numeric water quality criteria can be exceeded but designated uses in the water body on the whole are maintained and lethality is prevented.

“Natural lake” means an impoundment that is natural in origin. There are two natural lakes in Virginia: Mountain Lake in Giles County and Lake Drummond located within the boundaries of Chesapeake and Suffolk in the Great Dismal Swamp.

"Passing organisms" means free swimming organisms that move with a mean velocity at least equal to the ambient current in any direction.

"Primary contact recreation" means any water-based form of recreation, the practice of which has a high probability for total body immersion or ingestion of water (examples include but are not limited to swimming, water skiing, canoeing and kayaking).

"Pycnocline" means the portion of the water column where density changes rapidly because of salinity and/or temperature. In an estuary the pycnocline is the zone separating deep, cooler more saline waters from the less saline, warmer surface waters. The upper and lower boundaries of a pycnocline are measured as a change in density per unit of depth that is greater than twice the change of the overall average for the total water column.

"Secondary contact recreation" means a water-based form of recreation, the practice of which has a low probability for total body immersion or ingestion of waters (examples include but are not limited to wading, boating and fishing).

"Swamp waters" means waters with naturally occurring low pH and low dissolved oxygen caused by: (i) low flow velocity that prevents mixing and reaeration of stagnant, shallow waters and (ii) decomposition of vegetation that lowers dissolved oxygen concentrations and causes tannic acids to color the water and lower the pH.

"Use attainability analysis" means a structured scientific assessment of the factors affecting the attainment of the use which may include physical, chemical, biological, and economic factors as described in 9 VAC 25-260-10 H.

"Water quality standards" means provisions of state or federal law which consist of a designated use or uses for the waters of the Commonwealth and water quality criteria for such waters based upon such uses. Water quality standards are to protect the public health or welfare, enhance the quality of water and serve the purposes of the State Water Control Law (§ 62.1-44.2 et seq. of the Code of Virginia) and the federal Clean Water Act (33 USC § 1251 et seq.).

9 VAC 25-260-10. Designation of uses.

A. All State waters, including wetlands, are designated for the following uses: recreational uses, e.g., swimming and boating; the propagation and growth of a balanced, indigenous population of aquatic life, including game fish, which might reasonably be expected to inhabit them; wildlife; and the production of edible and marketable natural resources, e.g., fish and shellfish.

Subcategories of the propagation and growth of a balanced indigenous population of aquatic life, including game fish designated use for waters in the Chesapeake Bay and its tidal tributaries are listed in subsection B of this section.

B. Migratory Fish Spawning and Nursery Designated Use: waters in the Chesapeake Bay and its tidal tributaries that protect the survival, growth and propagation of the early life stages of a balanced, indigenous population of anadromous, semi-anadromous, catadromous and tidal-fresh resident fish species inhabiting spawning and nursery grounds. This designated use extents from the end of tidal waters to the downriver end of spawning and nursery habitats that have been determined through a composite of all targeted anadromous and semi-anadromous fish species' spawning and nursery habitats (see boundaries in U.S. Environmental Protection Agency. 2004. *Technical Support Document for Identification of Chesapeake Bay Designated Uses and Attainability 2004 Addendum.* Chesapeake Bay Program Office, Annapolis, Maryland). This designated use extends horizontally from the shoreline of the body of water to the adjacent shoreline, and extends down through the water column to the bottom water-sediment interface. This use applies February 1 through May 31 and applies in addition to the open-water use described in this subsection.

Shallow-Water Submerged Aquatic Vegetation Designated Use: waters in the Chesapeake Bay and its tidal tributaries that support the survival, growth and propagation of submerged aquatic vegetation (rooted, underwater bay grasses). This use applies April 1 through October 31 in tidal-fresh, oligohaline and mesohaline Chesapeake Bay Program segments, and March 1 through November 30 in polyhaline Chesapeake Bay Program segments and applies in addition to the open-water use described in this subsection.

Open-Water Aquatic Life Designated Use: waters in the Chesapeake Bay and it's tidal tributaries that protect the survival, growth and propagation of a balanced, indigenous population of aquatic life inhabiting open-water habitats. This designated use applies year-round but the vertical boundaries change seasonally. October 1 - May 31, the open water aquatic life use extends horizontally from the shoreline at mean low water, to the adjacent shoreline, and extending through the water column to the bottom water-sediment interface. June 1 - September 30, if a pycnocline is present and, in combination with bottom bathymetry and water column circulation patterns, presents a barrier to oxygen replenishment of deeper waters, this designated use extends down into the water column only as far as the upper boundary of the pycnocline. June 1 - September 30, if a pycnocline is present but other physical circulation patterns (such as influx of oxygen rich oceanic bottom waters) provide for oxygen replenishment of deeper waters, the open-water aquatic life designated use extends down into the bottom water-sediment interface (see boundaries in U.S. Environmental Protection Agency. 2004. *Technical Support Document for Identification of Chesapeake Bay Designated Uses and Attainability 2004 Addendum.* Chesapeake Bay Program Office, Annapolis, Maryland). This designated use includes the migratory fish spawning and nursery and shallow-water submerged aquatic vegetation uses.

Deep-Water Aquatic Life Designated Use: waters in the Chesapeake Bay and its tidal tributaries that protect the survival and growth of a balanced, indigenous population of aquatic life inhabiting deep-water habitats. This designated use extends to the tidally influenced waters located between the upper and lower boundaries of the pycnocline where, in combination with bottom bathymetry and water circulation patterns, a pycnocline is present and presents a barrier to oxygen replenishment of deeper waters. In some areas, the deep-water designated use extends from the upper boundary of the pycnocline down to the bottom water-sediment interface (see boundaries in U.S. Environmental Protection Agency. 2004. *Technical Support Document for Identification of Chesapeake Bay Designated Uses and Attainability 2004 Addendum.* Chesapeake Bay Program Office, Annapolis, Maryland). This use applies June 1 through September 30.

Deep-Channel Seasonal Refuge Designated Use: waters in the Chesapeake Bay and its tidal tributaries that protect the survival of a balanced, indigenous population of benthic infauna and epifauna inhabiting deep-channel habitats. This designated use extends to the tidally influenced waters at depths greater than the lower boundary of the pycnocline in areas where, in combination with bottom bathymetry and water circulation patterns, the pycnocline presents a barrier to oxygen replenishment of deeper waters (see boundaries in U.S. Environmental Protection

Agency. 2004. *Technical Support Document for Identification of Chesapeake Bay Designated Uses and Attainability 2004 Addendum.* Chesapeake Bay Program Office, Annapolis, Maryland). This use applies June 1 through September 30.

C. In designating uses of a water body and the appropriate criteria for those uses, the board shall take into consideration the water quality standards of downstream waters and shall ensure that its water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters.

D. The board may adopt subcategories of a use and set the appropriate criteria to reflect varying needs of such subcategories of uses, for instance, to differentiate between cold water (trout streams) and warm water fisheries.

E. At a minimum, uses are deemed attainable if they can be achieved by the imposition of effluent limits required under §§ 301(b) and 306 of the Clean Water Act and cost-effective and reasonable best management practices for nonpoint source control.

F. Prior to adding or removing any use, or establishing subcategories of a use, the board shall provide notice and an opportunity for a public hearing under the Administrative Process Act (§ 2.2-4000 et seq. of the Code of Virginia).

G. The board may adopt seasonal uses as an alternative to reclassifying a water body or segment thereof to uses requiring less stringent water quality criteria. If seasonal uses are adopted, water quality criteria should be adjusted to reflect the seasonal uses; however, such criteria shall not preclude the attainment and maintenance of a more protective use in another season.

H. The board may remove a designated use which is not an existing use, or establish subcategories of a use, if the board can demonstrate that attaining the designated use is not feasible because:

1. Naturally occurring pollutant concentrations prevent the attainment of the use;

2. Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating state water conservation requirements to enable uses to be met;

3. Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place;

4. Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use;

5. Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses; or

6. Controls more stringent than those required by §§ 301(b) and 306 of the Clean Water Act would result in substantial and widespread economic and social impact.

I. The board may not remove designated uses if:

1. They are existing uses, unless a use requiring more stringent criteria is added; or

2. Such uses will be attained by implementing effluent limits required under §§ 301b and 306 of the Clean Water Act and by implementing cost-effective and reasonable best management practices for nonpoint source control.

J. Where existing water quality standards specify designated uses less than those which are presently being attained, the board shall revise its standards to reflect the uses actually being attained.

K. The board must conduct a use attainability analysis whenever:

1. The board designates or has designated uses that do not include the uses specified in § 101(a)(2) of the Clean Water Act, or

2. The board wishes to remove a designated use that is specified in § 101(a)(2) of the Clean Water Act or to adopt subcategories of uses specified in § 101(a)(2) of the Clean Water Act which require less stringent criteria.

L. The board is not required to conduct a use attainability analysis under this chapter whenever designating uses which include those specified in subsection A of this section.

9 VAC 25-260-20. General criteria.

A. State waters, including wetlands, shall be free from substances attributable to sewage, industrial waste, or other waste in concentrations, amounts, or combinations which contravene established standards or interfere directly or indirectly with designated uses of such water or which are inimical or harmful to human, animal, plant, or aquatic life.

Specific substances to be controlled include, but are not limited to: floating debris, oil, scum, and other floating materials; toxic substances including those which bioaccumulate; substances that produce color, tastes, turbidity, odors, or settle to form sludge deposits; and substances which nourish undesirable or nuisance aquatic plant life. Effluents which tend to raise the temperature of the receiving water will also be controlled. Conditions within mixing zones established according to 9 VAC 25-260-20 B do not violate the provisions of this subsection.

B. The board may use mixing zone concepts in evaluating limitations for Virginia Pollutant Discharge Elimination System permits.

1. Mixing zones evaluated or established by the board in freshwater shall not:

a. Prevent movement of or cause lethality to passing and drifting aquatic organisms through the water body in question;

b. Constitute more than one half of the width of the receiving watercourse nor constitute more than one third of the area of any cross section of the receiving watercourse;

c. Extend downstream at any time a distance more than five times the width of the receiving watercourse at the point of discharge.

2. Mixing zones evaluated or established by the board in open ocean, estuarine and transition zone waters (see 9 VAC 25-260-140 C) shall not:

a. Prevent movement of or cause lethality to passing and drifting aquatic organisms through the water body in question;

b. Extend more than 5 times in any direction the average depth along a line extending 1/3 of the way across the receiving water from the discharge point to the opposite shore.

3. A subsurface diffuser shall be required for any new or expanded freshwater discharge greater than or equal to 0.5 MGD to open ocean, estuarine and transition zone waters (see 9 VAC 25-260-140 C) and the acute and chronic criteria shall be met at the edge of the zone of initial mixing. The zone of initial mixing is the area where mixing of ambient water and effluent is driven by the jet effect and/or momentum of the effluent. Beyond this zone the mixing is driven by ambient turbulence.

4. Mixing zones shall not be allowed by the board for effluents discharged to wetlands, swamps, marshes, lakes or ponds.

5. An allocated impact zone may be allowed within a mixing zone. This zone is the area of initial dilution of the effluent with the receiving water where the concentration of the effluent will be its greatest in the water column. Mixing within these allocated impact zones shall be as quick as practical and shall be sized to prevent lethality to passing and drifting aquatic organisms. The acute aquatic life criteria are not required to be attained in the allocated impact zone.

6. Mixing zones shall be evaluated or established such that acute criteria are met outside the allocated impact zone and chronic criteria are met at the edge of the mixing zone.

7. No mixing zone shall be used for, or considered as, a substitute for minimum treatment technology required by the Clean Water Act and other applicable state and federal laws.

8. The board shall not approve a mixing zone that violates the federal Endangered Species Act of 1973 (16 USCA §§ 1531-1543) or the Virginia Endangered Species Act, Article 6 (§ 29.1-563 et seq.) of Chapter 5 of Title 29.1 of the Code of Virginia.

9. The board may waive the requirements of subdivisions B 1 b and c, B 2 b, B 3 and B 4 of this subsection on a case by case basis if:

a. The board determines that a complete mix assumption is appropriate; or

b. A discharger provides an acceptable demonstration of:

(1) Information defining the actual boundaries of the mixing zone in question; and

(2) Information and data demonstrating no violation of subdivisions B 1 a, 2 a and B 7 of this subsection by the mixing zone in question.

10. The size of a thermal mixing zone shall be determined on a case-by-case basis. This determination shall be based upon a sound rationale and be supported by substantial biological, chemical, physical, and engineering evidence and analysis. Any such determination shall show to the board's satisfaction that no adverse changes in the protection and propagation of balanced indigenous populations of fish, aquatic life, and wildlife may reasonably be expected to occur. A satisfactory showing made in conformance with § 316(a) of the Clean Water Act shall be deemed as compliance with the requirements of this section.

11. Notwithstanding the above, no new or expanded mixing zone shall:

a. Be allowed in waters listed in 9 VAC 25-260-30 A 3 c;

b. Be allowed in waters defined in 9 VAC 25-260-30 A 2 for new or increased discharges unless the requirements outlined in 9 VAC 25-260-30 A 2 are satisfied.

9 VAC 25-260-30. Antidegradation policy.

A. All surface waters of the Commonwealth shall be provided one of the following three levels, or tiers, of antidegradation protection. This antidegradation policy shall be applied whenever any activity is proposed that has the potential to affect existing surface water quality.

1. As a minimum, existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.

2. Where the quality of the waters exceed water quality standards, that quality shall be maintained and protected unless the board finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the Commonwealth's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. In allowing such degradation or lower water quality, the board shall assure water quality adequate to protect existing uses fully. Further, the board shall assure that there shall be achieved the highest statutory and regulatory requirements applicable to all new or existing point source discharges of effluent and all cost-effective and reasonable best management practices for nonpoint source control.

3. Surface waters, or portions of these, which provide exceptional environmental settings and exceptional aquatic communities or exceptional recreational opportunities may be designated and protected as described in subdivisions 3 a, b and c of this subsection.

a. Designation procedures.

(1) Designations shall be adopted in accordance with the provisions of the Administrative Process Act (§ 2.2-4000 et seq. of the Code of Virginia) and the board's public participation guidelines.

(2) Upon receiving a nomination of a waterway or segment of a waterway for designation as an exceptional state water pursuant to the board's antidegradation policy, as required by 40 CFR 131.12, the board shall notify each locality in which the waterway or segment lies and shall make a good faith effort to provide notice to impacted riparian property owners. The written notice shall include, at a minimum: (i) a description of the location of the waterway or segment; (ii) the procedures and criteria for designation as well as the impact of the designation; (iii) the name of the person making the nomination; and iv the name of a contact person at the Department of Environmental Quality who is knowledgeable about the nomination and the waterway or segment. Notice to property owners shall be based on names and addresses taken from local tax rolls. Such names and addresses shall be provided by the Commissioners of the Revenue or the tax assessor's office of the affected jurisdiction upon request by the board. After receipt of the notice of the nomination, localities shall be provided 60 days to comment on the consistency of the nomination with the locality's comprehensive plan. The comment period established by subdivision 3 a (2) of this subsection shall in no way impact a locality's ability to comment during any additional comment periods established by the board.

b. Implementation procedures.

(1) The quality of waters designated in subdivision 3 c of this subsection shall be maintained and protected to prevent permanent or long-term degradation or impairment.

(2) No new, additional, or increased discharge of sewage, industrial wastes or other pollution into waters

designated in subdivision 3 c of this subsection shall be allowed.

(3) Activities causing temporary sources of pollution may be allowed in waters designated in subdivision 3 c of this subsection even if degradation may be expected to temporarily occur provided that after a minimal period of time the waters are returned or restored to conditions equal to or better than those existing just prior to the temporary source of pollution.

c. Surface waters designated under this subdivision are as follows:

(1) Little Stony Creek in Giles County from the first footbridge above the Cascades picnic area, upstream to the 3,300-foot elevation.

(2) Bottom Creek in Montgomery County and Roanoke County from Route 669 (Patterson Drive) downstream to the last property boundary of the Nature Conservancy on the southern side of the creek.

(3) Lake Drummond, located on U.S. Fish and Wildlife Service property, is nominated in its entirety within the cities of Chesapeake and Suffolk excluding any ditches and/or tributaries.

(4) North Creek in Botetourt County from the first bridge above the United States Forest Service North Creek Camping Area to its headwaters.

(5) Brown Mountain Creek, located on U.S. Forest Service land in Amherst County, from the City of Lynchburg property boundary upstream to the first crossing with the national forest property boundary.

(6) Laurel Fork, located on U.S. Forest Service land in Highland County, from the national forest property boundary below Route 642 downstream to the Virginia/West Virginia state line.

(7) North Fork of the Buffalo River, located on U.S. Forest Service land in Amherst County, from its confluence with Rocky Branch upstream to its headwaters.

(8) Pedlar River, located on U.S. Forest Service land in Amherst County, from where the river crosses FR 39 upstream to the first crossing with the national forest property boundary.

(9) Ramseys Draft, located on U.S. Forest Service land in Augusta County, from its headwaters (which includes Right and Left Prong Ramseys Draft) downstream to the Wilderness Area boundary.

(10) Whitetop Laurel Creek, located on U.S. Forest Service land in Washington County, from the national forest boundary immediately upstream from the second railroad trestle crossing the creek above Taylors Valley upstream to the confluence of Green Cove Creek.

(11) Ragged Island Creek in Isle of Wight County from its confluence with the James River at a line drawn across the creek mouth at N36°56.306'/W76°29.136' to N36°55.469'/W76°29.802' upstream to a line drawn across the main stem of the creek at N36°57.094'/W76°30.473' to N36°57.113'/W76°30.434', excluding wetlands and impounded areas and including only those tributaries completely contained within the Ragged Island Creek Wildlife Management Area on the northeastern side of the creek.

(12) Big Run in Rockingham County from its headwaters downstream to the first crossing with the Shenandoah National Park boundary and all tributaries to this segment of Big Run within the confines of Shenandoah National Park.

(13) Doyles River in Albemarle County from its headwaters to the first crossing with the Shenandoah National Park boundary and Jones Falls Run from its headwaters to its confluence with Doyles River and all tributaries to these segments of Doyles River and Jones Fall Run within the confines of Shenandoah National Park.

(14) East Hawksbill Creek in Page County from its headwaters downstream to the first crossing with the Shenandoah National Park boundary and all tributaries to this segment of East Hawksbill Creek within the confines of Shenandoah National Park.

(15) Jeremys Run in Page County from its headwaters downstream to the first crossing with the Shenandoah National Park boundary and all tributaries to this segment of Jeremys Run within the confines of Shenandoah National Park.

(16) East Branch Naked Creek in Page County from its headwaters downstream to the first crossing with the Shenandoah National Park boundary and all tributaries to this segment of East Branch Naked Creek within the confines of Shenandoah National Park.

(17) Piney River in Rappahannock County from its headwaters downstream to the first crossing with the

Shenandoah National Park boundary and all tributaries to this segment of the Piney River within the confines of Shenandoah National Park.

(18) North Fork Thornton River in Rappahannock County from its headwaters downstream to the first crossing with the Shenandoah National Park boundary and all tributaries to this segment of the North Fork Thornton River within the confines of Shenandoah National Park.

(19) Blue Suck Branch from its headwaters downstream to the first crossing with the George Washington National Forest boundary.

(20) Downy Branch from its headwaters downstream to the first crossing with the George Washington National Forest boundary.

(21) North Branch Simpson Creek (Brushy Run) from its headwaters downstream to its confluence with Simpson Creek.

(22) Roberts Creek from its confluence with the Pedlar River upstream to its first crossing with the National Forest boundary.

(23) Shady Mountain Creek from its headwaters downstream to its confluence with the Pedlar River.

(24) Cove Creek from its headwaters downstream to the National Forest boundary.

(25) Little Cove Creek and its tributaries from the headwaters downstream to the National Forest boundary.

(26) Rocky Branch from its headwaters downstream to its confluence with the North Fork of the Buffalo River.

(27) North Fork of the Buffalo River from its confluence with Rocky Branch downstream to the National Forest Boundary.

B. Any determinations concerning thermal discharge limitations made under § 316(a) of the Clean Water Act will be considered to be in compliance with the antidegradation policy.

9 VAC 25-260-40. Stream flow.

Man-made alterations in stream flow shall not contravene designated uses including protection of the propagation and growth of aquatic life.

9 VAC 25-260-50. Numerical criteria for dissolved oxygen, pH, and maximum temperature.***

CLASS	DESCRIPTION OF WATERS	DISSOLVED OXYGEN (mg/L)****		pH	Maximum Temp. (ºC)
		Min.	Daily Avg.		
I	Open Ocean	5.0	--	6.0-9.0	--
II	Tidal Waters in the Chowan Basin and the Atlantic Ocean	4.0	5.0	6.0-9.0	--
II	Tidal Waters in the Chesapeake Bay and its tidal tributaries	see 9 VAC 25-260-185		6.0-9.0	
III	Nontidal Waters Coastal and Piedmont Zones	4.0	5.0	6.0-9.0	32
IV	Mountainous Zones Waters	4.0	5.0	6.0-9.0	31
V	Stockable Trout Waters	5.0	6.0	6.0-9.0	21
VI	Natural Trout Waters	6.0	7.0	6.0-9.0	20
VII	Swamp Waters	*	*	4.3-9.0*	**

*This classification recognizes that the natural quality of these waters may fall outside of the ranges for D.O. and pH set forth above as water quality criteria; therefore, on a case-by-case basis, criteria for specific Class VII waters can be developed which reflect the natural quality of the waterbody. Virginia Pollutant Discharge Elimination System limitations in Class VII waters shall meet pH of 6.0 - 9.0.

**Maximum temperature will be the same as that for Classes I through VI waters as appropriate.

***The water quality criteria in this section do not apply below the lowest flow averaged arithmetic mean over a period of seven consecutive days that can be statistically expected to occur once every 10 climatic years (a climatic year begins

April 1 and ends March 31.)

****See 9 VAC 25-260-55 for implementation of these criteria in waters naturally low in dissolved oxygen.

***** For a thermally stratified man-made lake or reservoir in Class III, IV, V or VI waters that are listed in 9 VAC 25-260-187, these dissolved oxygen criteria apply only to the epilimnion in the lacustrine portion of the water body. When these waters are not stratified, the dissolved oxygen criteria apply throughout the water column.

9 VAC 25-260-55. Implementation procedure for dissolved oxygen criteria in waters naturally low in dissolved oxygen.

A. The board shall implement this procedure when assessing dissolved oxygen data in preparation of Clean Water Act §§ 305(b) and 303(d) reports in accordance with § 62.1-44.19.5 of the Water Quality Monitoring Information and Restoration Act. The board recognizes that dissolved oxygen concentrations may seasonally fall below the criteria established in 9 VAC 25-260-50 due to nonanthropogenic sources and physical and chemical processes resulting from:

1. Density stratification and depth in Class II waters that prevent mixing and reaeration of the deep waters,
2. Temperature stratification and depth in lakes and reservoirs in Class III, IV, V and VI waters that prevent mixing and re-aeraton of the deep waters, or
3. Minimal flow velocity and decomposition of vegetation that prevent mixing and reaeration of stagnant, shallow waters.

B. In preparation of the Clean Water Act §§ 305(b) and 303(d) reports the board shall list waters as naturally impaired in accordance with § 62.1-44.19:5 C of the Code of Virginia when the board determines that the low dissolved oxygen concentrations result from nonanthropogenic sources and the physical and chemical processes described in subsection A of this section. The board shall make this determination based upon an evaluation of aquatic life, habitat (including anadromous fish spawning areas), monitoring data, computer modeling results or other accepted scientific principles. The board shall also conduct a watershed assessment to document anthropogenic sources that individually or cumulatively cause low dissolved oxygen concentrations including locating and identifying all point and nonpoint sources of pollution and identifying any man-made activities (such as water withdrawals) that cause low flow conditions and result in low dissolved oxygen levels.

C. The proposed determinations in subsection B of this section shall be subject to public comment on draft 303(d) reports.

D. The final determinations in subsection B of this section shall be made available to the public in final 303(d) reports.

E. Following a determination made under subsection B of this section, the board shall initiate a rulemaking to set site-specific criteria that reflect the natural quality of that water body or segment.

9 VAC 25-260-60. Rise Above Natural Temperature

Any rise above natural temperature shall not exceed 3°C except in the case of Class VI waters (natural trout waters,) where it shall not exceed 1°C. However, the Board can, on a case-by-case basis, impose a more stringent limit on the rise above natural temperature. Natural temperature is defined as that temperature of a body of water (measured as the arithmetic average over one hour) due solely to natural conditions without the influence of any point-source discharge.

9 VAC 25-260-70. Maximum hourly temperature change.

The maximum hourly temperature change shall not exceed 2°C, except in the case of Class VI waters natural trout waters where it shall not exceed 0.5°C. These criteria shall apply beyond the boundaries of mixing zones and are in addition to temperature changes caused by natural conditions.

9 VAC 25-260-80. Thermal discharges into lakes and impoundments.

In lakes and impoundments receiving thermal discharges, the temperature of the epilimnion, or surface water when there is no stratification, shall not be raised more than 3°C above that which existed before the addition of heat of artificial origin. The board may, on a case-by-case basis, impose a more stringent limit on temperature rise. The increase shall be based on the monthly average of the maximum daily temperature. The temperature of releases from these lakes and impoundments shall be consistent with standards established for the receiving waters. When an applicant for a permit proposes either a discharge of heated effluent into the hypolimnion or the pumping of water from the hypolimnion for return back into the same body of water, such practice shall not be approved unless a special study shows that the practice will not produce adverse effects.

9 VAC 25-260-90. Site-specific temperature requirements.

A. The temperature limits set forth in 9 VAC 25-260-50 through 9 VAC 25-260-80 may be superseded in certain locations by Site-Specific Temperature Criteria or in the case where a thermal variance demonstration is performed in accordance with § 316(a) of the Clean Water Act. The protocol for development of site-specific temperature requirements is found in subsection A of this section. Information regarding § 316(a) demonstrations is found in subsection B of this section.

B. Protocol for Developing Site-Specific Temperature Criteria. For any specified time of year there shall be two upper limiting temperatures for a location based on temperature requirements of important sensitive species found at the location at that time. These limiting temperatures are:

1. A maximum weekly average temperature that:

a. In the warmer months is determined by adding to the physiological optimum temperature (usually the optimum for growth) for the most sensitive important species (and appropriate life stage) that normally is found at that location and time; a factor calculated as one third of the difference between the ultimate upper incipient lethal temperature and the optimum temperature for that species;

b. In the cooler months is an elevated temperature that would still ensure that important species would survive if the temperature suddenly dropped to the normal ambient temperature;

c. During reproduction seasons meets specific site requirements for successful migration, spawning, egg incubation, fry rearing, and other reproductive functions of important species; and

d. At a specific site is found necessary to preserve normal species diversity or prevent undesirable growths of nuisance organisms.

2. A time-dependent maximum temperature for short exposures.

Baseline thermal conditions shall be measured at a site where there is no unnatural thermal addition from any source, which site is in reasonable proximity to the thermal discharge (within five miles), and which has similar hydrography to that of the receiving waters at the point of discharge.

Criteria development should be in accordance with Water Quality Criteria 1972: A Report of the Committee on Water Quality Criteria and Quality Criteria for Water, U.S. Environmental Protection Agency.

C. § 316(a) Determinations. A successful demonstration accepted by the board concerning thermal discharge limits carried out under § 316(a) of the Clean Water Act shall constitute compliance with the temperature requirements of these standards. A successful demonstration must assure the protection and propagation of a balanced indigenous population of aquatic species and wildlife in or on the water into which the discharge is made. When making a determination concerning thermal discharge limits under § 316(a) of the Clean Water Act, the board shall provide notice and opportunity for a public hearing.

9 VAC 25-260-100. Deleted.

9 VAC 25-260-110. Halogen ban.

A. Chlorine or other halogen compounds[1] shall not be used for disinfection purposes or other treatment purposes including biocide applications for any treatment facility with a permitted flow of 20,000 gallons per day or more discharging to waters containing endangered or threatened species listed in subsection C of this section or to waters listed as i and ii in the River Basin Section Tables, 9 VAC 25-260-390 except for dischargers who intermittently chlorinate. Dischargers of less than 20,000 gallons per day shall dechlorinate to the requirements of the numerical chlorine criteria in 9 VAC 25-260-140 B or to

[1] Bromine, bromine chloride, hypochlorite and chlorine dioxide.

a nondetectable chlorine residual. Dischargers who intermittently chlorinate not more than two hours in any eight-hour period shall be required to install equipment or employ procedures, or both, to ensure dechlorination to a chlorine residual that meets the numerical chlorine criteria in 9 VAC 25-260-140 B, and to apply effective best management practices for chlorine. Dischargers who intermittently chlorinate shall, in order to address a possible malfunction of the dechlorination system, either have storage sufficient to contain the chlorinated water until it can be dechlorinated prior to discharge or have an online redundant and operational back-up dechlorination system.

B. Variance to this requirement shall not be made unless it has been affirmatively demonstrated that the existing uses of the water will be maintained and that either a change is justifiable to provide necessary economic or social development or the degree of waste treatment necessary to preserve the existing quality cannot be economically or socially justified.

C. TENNESSEE AND BIG SANDY RIVER BASINS

CLINCH RIVER SUBBASIN

Powell River from river mile 136 (south of Jonesville) downstream to the Tennessee/Virginia line river mile 115.8Xtotal 20.2 miles.

Endangered Species:

Appalachian monkeyface pearly mussel	*Quadrula sparsa*
Birdwing pearly mussel	*Conradilla caelata*
Cumberland monkeyface pearly mussel	*Quadrula intermedia*
Dromedary pearly mussel	*Dromus dromas*
Fine-rayed pigtoe pearly mussel	*Fusconaia cuneolus*
Shiny pigtoe pearly mussel	*Fusconaia edgariana*

Threatened Species:

Slender chub	*Hybopsis cahni*
Yellowfin madtom	*Noturus flavipinnis*

Clinch River from river mile 323 (Richlands) downstream to the Tennessee/Virginia line (river mile 202.1.)

Endangered Species:

Appalachian monkeyface pearly mussel	*Quadrula sparsa*
Birdwing pearly mussel	*Conradilla caelata*
Fine-rayed pigtoe pearly mussel	*Fusconaia cuneolus*
Green blossom pearly mussel	*Dysnomia torulosa gubernaculum*
Pink mucket pearly mussel	*Lampsilis orbiculata*
Shiny pigtoe pearly mussel	*Fusconaia edgariana*

Clinch River from the Scott/Russell County line (at Bangor - river mile 244.2) downstream to the Tennessee boundary (river mile 202.1.)

Threatened Species:

Slender chub	*Hybopsis cahni*

Copper Creek from 2 miles above its confluence with the Clinch River river mile (211.6.)

Endangered Species:

Fine-rayed pigtoe pearly mussel	*Fusconaia cuneolus*
Shiny pigtoe pearly mussel	*Fusconaia edgariana*

Copper Creek from Dickensville (river mile 56) in Russell County downstream to its confluence with the Clinch River.

Threatened Species:

Yellowfin madtom	*Noturus flavipinnis*

HOLSTON RIVER SUBBASIN

North Fork Holston River from river mile 93.3 (near Broadford) downstream to the Smyth/Washington County line (river mile 82.1.)

Endangered Species:

Shiny pigtoe pearly mussel	*Fusconaia edgariana*

North Fork Holston River from the Smyth/Washington County line (river mile 82.1) to the Tennessee/Virginia boundary (river mile 5.)

Threatened Species:

Spotfin chub	*Hybopsis monacha*

Middle Fork Holston River from river mile 43 (in Marion) downstream to river mile 18.4.

Endangered Species:

Tan riffle shell mussel	*Dysnomia walkeri*

Middle Fork Holston River from river mile 6.5 to river mile 3.2 near Osceola.

Threatened Species:

Spotfin chub	*Hybopsis monacha*

9 VAC 25-260-120. (Repealed).

9 VAC 25-260-130. (Repealed).

9 VAC 25-260-140. Criteria for surface water.

A. Instream water quality conditions shall not be acutely[2] or chronically[3] toxic except as allowed in 9 VAC 25-260-20 B mixing zones. The following are definitions of acute and chronic toxicity conditions:

"Acute toxicity" means an adverse effect that usually occurs shortly after exposure to a pollutant. Lethality to an organism is the usual measure of acute toxicity. Where death is not easily detected, immobilization is considered equivalent to death.

"Chronic toxicity" means an adverse effect that is irreversible or progressive or occurs because the rate of injury is greater than the rate of repair during prolonged exposure to a pollutant. This includes low level, long-term effects such as reduction in growth or reproduction.

B. The following table is a list of numerical water quality criteria for specific parameters.

When information has become available from the Environmental Protection Agency to calculate additional aquatic life or human health criteria not contained in the table, the board may employ these values in establishing effluent limitations or other limitations pursuant to 9 VAC 25-260-20 A necessary to protect designated uses until the board has completed the regulatory standards adoption process.

Table of Parameters [6]

PARAMETER CAS Number	**USE DESIGNATION**					
	AQUATIC LIFE				**HUMAN HEALTH**	
	FRESHWATER		**SALTWATER**		**Public Water Supply**[3]	**All Other Surface Waters**[4]
	Acute[1]	Chronic[2]	Acute[1]	Chronic[2]		
Acenapthene(µg/l) 83329					1,200	2,700
Acrolein (µg/l) 107028					320	780
Acrylonitrile (µg/l) 107131 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.					0.59	6.6
Aldrin (µg/l) 309002 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.	3.0		1.3		0.0013	0.0014
Ammonia (µg/l) 766-41-7 Chronic criterion is a 30-day average concentration not to be exceeded more than once every three 3 years on the average. (see 9 VAC 25-260-155)						
Anthracene (µg/l) 120127					9,600	110,000
Antimony (µg/l) 7440360					14	4,300
Arsenic (µg/l [5]) 7440382	340	150	69	36	10	

PARAMETER CAS Number	USE DESIGNATION					
	AQUATIC LIFE				HUMAN HEALTH	
	FRESHWATER		SALTWATER			
	Acute[1]	Chronic[2]	Acute[1]	Chronic[2]	Public Water Supply[3]	All Other Surface Waters[4]
Bacteria (see 9 VAC 25-260-160 and 170)						
Barium (mg/l) 7440393					2,000	
Benzene mg/l 71432 Known or suspected carcinogen; human health criteria at risk level 10^{-5}					12	710
Benzidine (mg/l) 92875 Known or suspected carcinogen; human health criteria at risk level 10^{-5}					0.0012	0.0054
Benzo (a) anthracene (mg/l) 56553 Known or suspected carcinogen; human health criteria at risk level 10^{-5}					0.044	0.49
Benzo (b) fluoranthene (mg/l) 205992 Known or suspected carcinogen; human health criteria at risk level 10^{-5}					0.044	0.49
Benzo (k) fluoranthene (mg/l) 207089 Known or suspected carcinogen; human health criteria at risk level 10^{-5}					0.044	0.49
Benzo (a) pyrene (mg/l) 50328 Known or suspected carcinogen; human health criteria at risk level 10^{-5}					0.044	0.49
Bis2-Chloroethyl Ether 111444 Known or suspected carcinogen; human health criteria at risk level 10^{-5}					0.31	14
Bis2-Chloroisopropyl Ether (mg/l) 39638329					1,400	170,000
Bromoform (mg/l) 75252 Known or suspected carcinogen; human health criteria at risk level $10^{-5.}$					44	3,600
Butyl benzyl phthalate (mg/l) 85687					3,000	5,200

PARAMETER CAS Number	USE DESIGNATION					
	AQUATIC LIFE				HUMAN HEALTH	
	FRESHWATER		SALTWATER			
	Acute[1]	Chronic[2]	Acute[1]	Chronic[2]	Public Water Supply[3]	All Other Surface Waters[4]
Cadmium (mg/l[5]) 7440439 Freshwater values are a function of total hardness as calcium carbonate $CaCO_3$ mg/l and the WER. The minimum hardness allowed for use in the equation below shall be 25 and the maximum hardness shall be 400 even when the actual ambient hardness is less than 25 or greater than 400. **Freshwater acute criterion (mg/l)** $WER\left[e^{\{1.128[\ln(hardness)]-3.828\}}\right]$ **Freshwater chronic criterion** (mg/l) $WER\left[e^{\{0.7852[\ln(hardness)]-3.490\}}\right]$ WER = Water Effect Ratio =1 unless shown otherwise under 9 VAC 25-260-140.F and listed in 9 VAC 25-260-310 e = natural antilogarithm ln = natural logarithm	3.9 WER = 1 $CaCO_3$=100	1.1 WER = 1 $CaCO_3$ = 100	40 WER=1	8.8 WER=1	5	
Carbon tetrachloride (mg/l) 56235 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.					2.5	44
Chlordane (mg/l) 57749 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.	2.4	0.0043	0.09	0.0040	0.021	0.022
Chloride (mg/l) 16887006 Human Health criterion to maintain acceptable taste and aesthetic quality and applies at the drinking water intake.	860,000	230,000			250,000	
Chlorine, Total Residual (mg/l) 7782505 In DGIF class i and ii trout waters (9 VAC 25-260 subsections 390-540) or waters with threatened or endangered species are subject to the halogen ban (subsection 110.)	19 See 9 VAC 25-260-110	11 See 9 VAC 25-260-110				
Chlorine Produced Oxidant (mg/l) 7782505			13	7.5		
Chlorobenzene (mg/l) 108907					680	21,000

PARAMETER CAS Number	USE DESIGNATION					
	AQUATIC LIFE				HUMAN HEALTH	
	FRESHWATER		SALTWATER			
	Acute[1]	Chronic[2]	Acute[1]	Chronic[2]	Public Water Supply[3]	All Other Surface Waters[4]
Chlorodibromomethane (µg/l) 124481 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.					4.1	340
Chloroform (µg/l) 67663 Known or suspected carcinogen; however, non-carcinogen calculation used and is protective of carcinogenic effects. Use 30Q5 as default design flow (see footnote 6.)					350	29,000
2-Chloronaphthalene (µg/l) 91587					1,700	4,300
2-Chlorophenol (µg/l) 95578					120	400
Chlorpyrifos (µg/l) 2921882	0.083	0.041	0.011	0.0056		
Chromium III (µg/l[50] 16065831 Freshwater values are a function of total hardness as calcium carbonate $CaCO_3$ mg/l and the WER. The minimum hardness allowed for use in the equation below shall be 25 and the maximum hardness shall be 400 even when the actual ambient hardness is less than 25 or greater than 400. **Freshwater acute criterion µg/l** $WER\left[e^{\{0.8190[\ln(hardness)]+3.7256\}}\right](CF_a)$ **Freshwater chronic criterion µg/l** $WER\left[e^{\{0.8190[\ln(hardness)]+0.6848\}}\right](CF_C)$ WER = Water Effect Ratio = 1 unless shown otherwise under 9 VAC 25-260-140.F and listed in 9 VAC 25-260-310 e = natural antilogarithm ln=natural logarithm CF_a=0.316 CF_C=0.860	570 (WER=1; $CaCO_3$= 100)	74 (WER=1; $CaCO_3$=100)			100 (total Cr)	
Chromium VI (µg/l[5)] 18540299	16	11	1,100	50		

PARAMETER CAS Number	USE DESIGNATION					
	AQUATIC LIFE				HUMAN HEALTH	
	FRESHWATER		SALTWATER			
	Acute[1]	Chronic[2]	Acute[1]	Chronic[2]	Public Water Supply[3]	All Other Surface Waters[4]
Chrysene (mg/l) 218019 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.					0.044	0.49
Copper (mg/l[5]) 7440508 Freshwater values are a function of total hardness as calcium carbonate $CaCO_3$ mg/l and the WER. The minimum hardness allowed for use in the equation below shall be 25 and the maximum hardness shall be 400 even when the actual ambient hardness is less than 25 or greater than 400. **Freshwater acute criterion** (mg/l) $WER\left[e^{\{0.9422[\ln(hardness)]-1.700\}}\right](CF_a)$ **Freshwater chronic criterion** mg/l $WER\left[e^{\{0.8545[\ln(hardness)]-1.702\}}\right](CF_c)$ WER = Water Effect Ratio =1 unless shown otherwise under 9 VAC 25-260-140.F and listed in 9 VAC 25-260-310. e = natural antilogarithm ln=natural logarithm CF_a = 0.960 CF_c = 0.960 Acute saltwater criterion is a 24-hour average not to be exceeded more than once every three years on the average.	13 WER=1 $CaCO_3$= 100	9.0 WER=1 $CaCO_3$= 100	9.3 WER=1	6.0 WER=1	1,300	
Cyanide (mg/l) 57125	22	5.2	1.0	1.0	700	220,000
DDD (mg/l) 72548 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.					0.0083	0.0084
DDE (mg/l) 72559 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.					0.0059	0.0059
DDT (mg/l) 50293 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.	1.1	0.0010	0.13	0.0010	0.0059	0.0059

PARAMETER CAS Number	USE DESIGNATION					
	AQUATIC LIFE				HUMAN HEALTH	
	FRESHWATER		SALTWATER		Public Water Supply[3]	All Other Surface Waters[4]
	Acute[1]	Chronic[2]	Acute[1]	Chronic[2]		
Demeton (mg/l) 8065483		0.1		0.1		
Dibenz (a,h) anthracene (mg/l) 53703 Known or suspected carcinogen; human health criteria at risk level $10^{-5.}$					0.044	0.49
Dibutyl phthalate mg/l 84742					2,700	12,000
Dichloromethane (mg/l) 75092 Known or suspected carcinogen; human health criteria at risk level 10^{-5} Synonym = Methylene Chloride					47	16,000
1,2–Dichlorobenzene (mg/l0) 95501					2,700	17,000
1,3– Dichlorobenzene (mg/l) 541731					400	2,600
1,4 Dichlorobenzene (mg/l) 106467					400	2,600
3,3 Dichlorobenzidine 91941 Known or suspected carcinogen; human health criteria at risk level $10^{-5.}$					0.4	0.77
Dichlorobromomethane (mg/l) 75274 Known or suspected carcinogen; human health criteria at risk level $10^{-5.}$					5.6	460
1,2 Dichloroethane (mg/l) 107062 Known or suspected carcinogen; human health criteria at risk level $10^{-5.}$					3.8	990
1,1 Dichloroethylene (mg/l) 75354					310	17,000
1,2-trans-dichloroethylene (mg/l) 156605					700	140,000

PARAMETER CAS Number	USE DESIGNATION					
	AQUATIC LIFE				HUMAN HEALTH	
	FRESHWATER		SALTWATER			
	Acute[1]	Chronic[2]	Acute[1]	Chronic[2]	Public Water Supply[3]	All Other Surface Waters[4]
2,4 Dichlorophenol (mg/l) 120832					93	790
2,4 Dichlorophenoxy acetic acid (2,4-D) (mg/l) 94757					100	
1,2-Dichloropropane (mg/l) 78875 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.					5.2	390
1,3-Dichloropropene (mg/l) 542756					10	1,700
Dieldrin (mg/l) 60571 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.	0.24	0.056	0.71	0.0019	0.0014	0.0014
Diethyl Phthalate (mg/l) 84662					23,000	120,000
Di-2-Ethylhexyl Phthalate (mg/l) 117817 Known or suspected carcinogen; human health criteria at risk level 10^{-5}. Synonym = Bis2-Ethylhexyl Phthalate.					18	59
2,4 Dimethylphenol (mg/l) 105679					540	2,300
Dimethyl Phthalate (mg/l) 131113					313,000	2,900,000
Di-n-Butyl Phthalate (mg/l) 84742					2,700	12,000
2,4 Dinitrophenol (mg/l) 51285					70	14,000
2-Methyl-4,6-Dinitrophenol (mg/l) 534521					13.4	765

PARAMETER CAS Number	USE DESIGNATION					
	AQUATIC LIFE				HUMAN HEALTH	
	FRESHWATER		SALTWATER			
	Acute[1]	Chronic[2]	Acute[1]	Chronic[2]	Public Water Supply[3]	All Other Surface Waters[4]
2,4 Dinitrotoluene (µg/l) 121142 Known or suspected carcinogen; human health criteria at risk level 10^{-5}					1.1	91
Dioxin 2, 3, 7, 8-tetrachlorodibenzo-p-dioxin (ppq) 1746016 Criteria are based on a risk level of 10^{-5} and potency of 1.75×10^{-4} mg/kg–day^{-1} To calculate an average effluent permit limit, use mean annual stream flow.					1.2	1.2
1,2-Diphenylhydrazine (µg/l) 122667 Known or suspected carcinogen; human health criteria at risk level 10^{-5}					0.40	5.4
Dissolved Oxygen (mg/l) (See 9 VAC 25-260-50 and 9 VAC 25-260-55)						
Alpha-Endosulfan (µg/l) 959988	0.22	0.056	0.034	0.0087	110	240
Beta-Endosulfan (µg/l) 33213659	0.22	0.056	0.034	0.0087	110	240
Endosulfan Sulfate (µg/l) 1031078					110	240
Endrin (µg/l) 72208	0.086	0.036	0.037	0.0023	0.76	0.81
Endrin Aldehyde (µg/l) 7421934					0.76	0.81
Ethylbenzene (µg/l) 100414					3,100	29,000
Fecal Coliform (see 9 VAC 25-260-160 and 9 VAC 25-260-170)						
Fluoranthene (µg/l) 206440					300	370

PARAMETER CAS Number	USE DESIGNATION					
	AQUATIC LIFE				HUMAN HEALTH	
	FRESHWATER		SALTWATER			
	Acute[1]	Chronic[2]	Acute[1]	Chronic[2]	Public Water Supply[3]	All Other Surface Waters[4]
Fluorene (µg/l) 86737					1,300	14,000
Foaming Agents (µg/l) Criterion measured as methylene blue active substances. Criterion to maintain acceptable taste, odor, or aesthetic quality of drinking water and applies at the drinking water intake.					500	
Guthion (µg/l) 86500		0.01		0.01		
Heptachlor (µg/l) 76448 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.	0.52	0.0038	0.053	0.0036	0.0021	0.0021
Heptachlor Epoxide (µg/l) 1024573 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.	0.52	0.0038	0.053	0.0036	0.0010	0.0011
Hexachlorobenzene (µg/l) 118741 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.					0.0075	0.0077
Hexachlorobutadiene (µg/l) 87683 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.					4.4	500
Hexachlorocyclohexane Alpha-BHC (µg/l) 319846 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.					0.039	0.13
Hexachlorocyclohexane Beta-BHC (µg/l) 319857 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.					0.14	0.46
Hexachlorocyclohexane (µg/l) (Lindane) Gamma-BHC 58899 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.	0.95		0.16		0.19	0.63
Hexachlorocyclopentadiene (µg/l) 77474					240	17,000

PARAMETER CAS Number	USE DESIGNATION					
	AQUATIC LIFE				HUMAN HEALTH	
	FRESHWATER		SALTWATER			
	Acute[1]	Chronic[2]	Acute[1]	Chronic[2]	Public Water Supply[3]	All Other Surface Waters[4]
Hexachloroethane (µg/l) 67721 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.					19	89
Hydrogen sulfide (µg/l) 7783064		2.0		2.0		
Indeno (1,2,3,-cd) pyrene (µg/l) 193395 Known or suspected carcinogen; human health criteria at risk level $10^{-5.}$					0.044	0.49
Iron (µg/l) 7439896 Criterion to maintain acceptable taste, odor or aesthetic quality of drinking water and applies at the drinking water intake.					300	
Isophorone (µg/l) 78591 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.					360	26,000
Kepone (µg/l) 143500		zero		zero		
Lead (µg/l)[5] 7439921 Freshwater values are a function of total hardness as calcium carbonate $CaCO_3$ mg/l and the water effect ratio. The minimum hardness allowed for use in the equation below shall be 25 and the maximum hardness shall be 400 even when the actual ambient hardness is less than 25 or greater than 400. **Freshwater acute criterion (µg/l)** $WER\left[e^{\{1.273[\ln(hardness)]-1.084\}}\right]$ **Freshwater chronic criterion (µg/l)** $WER\left[e^{\{1.273[\ln(hardness)]-3.259\}}\right]$ WER = Water Effect Ratio =1 unless shown otherwise under 9 VAC 25-260-140.F and listed in 9 VAC 25-260-310 e = natural antilogarithm ln = natural logarithm	120 WER = 1 $CaCO_3$ = 100	14 WER =1 $CaCO_3$= 100	240 WER=1	9.3 WER=1	15	
Malathion (µg/l) 121755		0.1		0.1		

PARAMETER CAS Number	USE DESIGNATION					
	AQUATIC LIFE				HUMAN HEALTH	
	FRESHWATER		SALTWATER			
	Acute[1]	Chronic[2]	Acute[1]	Chronic[2]	Public Water Supply[3]	All Other Surface Waters[4]
Manganese (µg/l) 7439965 Criterion to maintain acceptable taste, odor or aesthetic quality of drinking water and applies at the drinking water intake.					50	
Mercury µg/l [5] 7439976	1.4	0.77	1.8	0.94	0.050	0.051
Methyl Bromide (µg/l) 74839					48	4,000
Methoxychlor (µg/l) 72435		0.03		0.03	100	
Mirex (µg/l) 2385855		zero		zero		
Monochlorobenzene (µg/l) 108907					680	21,000
Nickel (µg/L[5)] 744002 Freshwater values are a function of total hardness as calcium carbonate $CaCO_3$ mg/l and the WER. The minimum hardness allowed for use in the equation below shall be 25 and the maximum hardness shall be 400 even when the actual ambient hardness is less than 25 or greater than 400. **Freshwater acute criterion µg/l** $WER[e^{\{0.8460[\ln(hardness)] + 1.312\}}](CF_a)$ **Freshwater chronic criterion (µg/l)** $WER[e^{\{0.8460[\ln(hardness)] - 0.8840\}}](CF_c)$ WER =Water Effect Ratio = unless shown otherwise under 9 VAC 25-260-140.F and listed in 9 VAC 25-250-310 e = natural antilogarithm ln = natural logarithm $(CF_a) = 0.998$ $(CF_c) = 0.997$	180 WER =1 $CaCO_3$ = 100	20 WER = 1 $CaCO_3$ = 100	74 WER=1	8.2 WER=1	610	4,600
Nitrate as N (µg/l) 14797558					10,000	

PARAMETER CAS Number	USE DESIGNATION					
	AQUATIC LIFE				HUMAN HEALTH	
	FRESHWATER		SALTWATER		Public Water Supply[3]	All Other Surface Waters[4]
	Acute[1]	Chronic[2]	Acute[1]	Chronic[2]		
Nitrobenzene (mg/l) 98953					17	1,900
N-Nitrosodimethylamine (mg/l) 62759 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.					0.0069	81
N-Nitrosodiphenylamine (mg/l) 86306 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.					50	160
N-Nitrosodi-n-propylamine (mg/l) 621647 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.					0.05	14
Parathion (mg/l) 56382	0.065	0.013				
PCB 1260 (mg/l) 11096825		0.014		0.030		
PCB 1254 (mg/l) 11097691		0.014		0.030		
PCB 1248 (mg/l) 12672296		0.014		0.030		
PCB 1242 (mg/l) 53469219		0.014		0.030		
PCB 1232 (mg/l) 11141165		0.014		0.030		
PCB 1221 (mg/l) 11104282		0.014		0.030		
PCB 1016 (mg/l) 12674112		0.014		0.030		

PARAMETER CAS Number	USE DESIGNATION					
	AQUATIC LIFE				HUMAN HEALTH	
	FRESHWATER		SALTWATER			
	Acute[1]	Chronic[2]	Acute[1]	Chronic[2]	Public Water Supply[3]	All Other Surface Waters[4]
PCB Total (µg/l) 1336363 Known or suspected carcinogen; human health criteria at risk level 10^{-5}					0.0017	0.0017
Pentachlorophenol (µg/l) 87865 Known or suspected carcinogen; human health criteria risk level at 10^{-5} **Freshwater acute criterion (µg/l)** $e^{(1.005(pH)-4.8\ 69)}$ **Freshwater chronic criterion (µg/l)** $e^{(1.005(pH)-5.134)}$	8.7 pH = 7.0	6.7 pH = 7.0	13	7.9	2.8	82
pH See § 9VAC25-260-50						
Phenol (µg/l) 108952					21,000	4,600,000
Phosphorus Elemental (µg/l) 7723140				0.10		
Pyrene (µg/l) 129000					960	11,000
Radionuclides **Gross Alpha Particle Activity (pCi/L)** **Beta Particle & Photon Activity (mrem/yr)** (formerly man-made radio nuclides) **Strontium 90 (pCi/L)** **Tritium (pCi/L)**					15 4 8 20,000	15 4 8 20,000
Selenium (µg/l[50] 7782492 WER shall not be used for freshwater acute and chronic criteria.	20	5.0	300 WER=1	71 WER=1	170	11,000
Silver (µg/l)[5] 7440224 Freshwater values are a function of total hardness as calcium carbonate ($CaCO_3$) mg/l and the WER. The minimum hardness allowed for use in the equation below shall be 25 and the maximum hardness shall be 400 even when the actual ambient hardness is less than 25 or greater than 400.	3.4 WER=1; $CaCO_3$= 100		2.0 WER=1			

PARAMETER CAS Number	USE DESIGNATION					
	AQUATIC LIFE				HUMAN HEALTH	
	FRESHWATER		SALTWATER			
	Acute[1]	Chronic[2]	Acute[1]	Chronic[2]	Public Water Supply[3]	All Other Surface Waters[4]
Freshwater acute criterion (µg/l) WER $[e^{\{1.72[\ln(\text{hardness})]-6.52\}}]$ (CF_a) WER = Water Effect Ratio = 1 unless shown otherwise under 9 VAC 25-260-140.F and listed in 9 VAC 25-260-310 e = natural antilogarithm ln=natural logarithm (CF_a) = 0.85						
Sulfate (µg/l) Criterion to maintain acceptable taste, odor or aesthetic quality of drinking water and applies at the drinking water intake.					250,000	
Temperature See 9 VAC 25-260-50						
1,1,2,2-Tetrachloroethane (µg/l) 79345 Known or suspected carcinogen; human health criteria at risk level 10^{-5}					1.7	110
Tetrachloroethylene (µg/l) 127184 Known or suspected carcinogen; human health criteria at risk level 10^{-5}					8.0	89
Thallium (µg/l) 7440280					1.7	6.3
Toluene (µg/l) 108883					6,800	200,000
Total Dissolved Solids (µg/l) Criterion to maintain acceptable taste, odor or aesthetic quality of drinking water and applies at the drinking water intake.					500,000	
Toxaphene (µg/l) 8001352 The chronic aquatic life criteria have been calculated to also protect wildlife from harmful effects through ingestion of contaminated tissue. Known or suspected carcinogen; human health criteria at risk level $10^{-5.}$	0.73	0.0002	0.21	0.0002	0.0073	0.0075
Tributyltin (µg/l) 60105	0.46	0.063	0.38	0.001		

PARAMETER CAS Number	USE DESIGNATION					
	AQUATIC LIFE				HUMAN HEALTH	
	FRESHWATER		SALTWATER			
	Acute[1]	Chronic[2]	Acute[1]	Chronic[2]	Public Water Supply[3]	All Other Surface Waters[4]
1, 2, 4 Trichlorobenzene (µg/l) 120821					260	940
1,1,2-Trichloroethane (µg/l) 79005 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.					6.0	420
Trichloroethylene (µg/l) 79016 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.					27	810
2, 4, 6 –Trichlorophenol 88062 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.					21	65
2–(2, 4, 5 –Trichlorophenoxy propionic acid (Silvex) (µg/l)					50	
Vinyl Chloride (µg/l) 75014 Known or suspected carcinogen; human health criteria at risk level 10^{-5}.					0.23	61
Zinc (µg/l)[5] Freshwater values are a function of total hardness as calcium carbonate ($CaCO_3$) mg/l and the WER. The minimum hardness allowed for use in the equation below shall be 25 and the maximum, hardness shall be 400 even when the actual ambient hardness is less than 25 or greater than 400 . **Freshwater acute criterion µg/l** $WER\left[e^{\{0.8473[\ln(hardness)]+0.884\}}\right](CF_a)$ **Freshwater chronic criterion µg/l** $WER\left[e^{\{0.8473[\ln(hardness)]+0.884\}}\right](CF_c)$ WER = Water Effect Ratio = 1 unless shown otherwise under 9 VAC 25-260-140.F and listed in 9 VAC 25-260-310 e = base e exponential function. ln = log normal function $CF_a = 0.978$ $CF_c = 0.986$	120 WER=1 $CaCO_3$= 100	120 WER=1 $CaCO_3$= 100	90 WER=1	81 WER=1	9,100	69,000

[1] One hour average concentration not to be exceeded more than once every 3 years on the average, unless otherwise noted.
[2] Four-day average concentration not to be exceeded more than once every 3 years on the average, unless otherwise noted.
[3] Criteria have been calculated to protect human health from toxic effects through drinking water and fish consumption, unless otherwise noted and apply in segments designated as PWS in 9 VAC 25-260-390-540.
[4] Criteria have been calculated to protect human health from toxic effects through fish consumption, unless otherwise noted and apply in all other surface waters not designated as PWS in 9 VAC 25-260-390-540.

[5] Acute and chronic saltwater and freshwater aquatic life criteria apply to the biologically available form of the metal and apply as a function of the pollutant's water effect ratio (WER) as defined in 9 VAC 25-260-140 F (WER X criterion.) Metals measured as dissolved shall be considered to be biologically available, or, because local receiving water characteristics may otherwise affect the biological availability of the metal, the biologically available equivalent measurement of the metal can be further defined by determining a Water Effect Ratio (WER) and multiplying the numerical value shown in 9 VAC 25-260-140 B by the WER. Refer to 9 VAC 25-260-140 F. Values displayed above in the table are examples and correspond to a (WER) of 1.0. Metals criteria have been adjusted to convert the total recoverable fraction to dissolved fraction using a conversion factor. Criteria that change with hardness have the conversion factor listed in the table above.

[6] The flows listed below are default design flows for calculating steady state waste load allocations unless statistically valid methods are employed which demonstrate compliance with the duration and return frequency of the water quality criteria.

Aquatic Life:

Acute criteria	1Q10
Chronic criteria	7Q10
Chronic criteria (ammonia)	30Q10

Human Health:

Non-carcinogens	30Q5
Carcinogens	Harmonic mean (An exception to this is for the carcinogen dioxin. The applicable stream flow for dioxin is the mean annual stream flow.)

The following are defined for this section:

"1Q10" means the lowest flow averaged over a period of one day which on a statistical basis can be expected to occur once every 10 climatic years.

"7Q10" means the lowest flow averaged over a period of seven consecutive days that can be statistically expected to occur once every 10 climatic years.

"30Q5" means the lowest flow averaged over a period of 30 consecutive days that can be statistically expected to occur once every five climatic years.

"30Q10" means the lowest flow averaged over a period of 30 consecutive days that can be statistically expected to occur once every 10 climactic years.

"Averaged" means an arithmetic mean.

"Climatic year" means a year beginning on April 1 and ending on March 31.

C. Application of freshwater and saltwater numerical criteria.

The numerical water quality criteria listed in subsection B of this section (excluding dissolved oxygen, pH, temperature) shall be applied according to the following classes of waters (see 9 VAC 25-260-50) and boundary designations:

CLASS OF WATERS	NUMERICAL CRITERIA
I and II (Estuarine Waters)	Saltwater criteria apply
II (Transition Zone)	More stringent of either the freshwater or saltwater criteria apply

II (Tidal Freshwater,) III, IV, V, VI and VII	Freshwater criteria apply

The following describes the boundary designations for Class II, (estuarine, transition zone and tidal freshwater waters) by river basin:

1. Rappahannock Basin.

Tidal freshwater is from the fall line of the Rappahannock River to Buoy 37 near Tappahannock, Virginia, including all tidal tributaries that enter the tidal freshwater Rappahannock River.

Transition zone is from Buoy 37 to Buoy 11 near Morattico, Virginia, including all tidal tributaries that enter the transition zone of the Rappahannock River.

Estuarine waters are from Buoy 11 to the mouth of the Rappahannock River (Buoy 6), including all tidal tributaries that enter the estuarine waters of the Rappahannock River.

2. York Basin.

Tidal freshwater is from the fall line of the Mattaponi River to Clifton, Virginia, and from the fall line of the Pamunkey River to Sweet Hall Landing, Virginia, including all tidal tributaries that enter the tidal freshwaters of the Mattaponi and Pamunkey Rivers.

Transition zone of the Mattaponi River is from Clifton, Virginia to the York River and the transition zone of the Pamunkey River is from Sweet Hall Landing, Virginia, to the York River. The transition zone for the York River is from West Point, Virginia, to Buoy 13 near Poropotank Bay. All tidal tributaries that enter the transition zones of the Mattaponi, Pamunkey, and York Rivers are themselves in the transition zone.

Estuarine waters are from Buoy 13 to the mouth of the York River (Tue Marsh Light) including all tidal tributaries that enter the estuarine waters of the York River.

3. James Basin.

Tidal Freshwater is from the fall line of the James River to the confluence of the Chickahominy River Buoy 70, including all tidal tributaries that enter the tidal freshwater James River.

Transition zone is from (Buoy 70) to Buoy 47 near Jamestown Island including all tidal tributaries that enter the transition zone of the James River.

Estuarine waters are from Buoy 47 to the mouth of the James River (Buoy 25) including all tidal tributaries that enter the estuarine waters of the James River.

4. Potomac Basin.

Tidal Freshwater includes all tidal tributaries that enter the Potomac River from its fall line to Buoy 43 near Quantico, Virginia.

Transition zone includes all tidal tributaries that enter the Potomac River from Buoy 43 to Buoy 33 near Dahlgren, Virginia.

Estuarine waters includes all tidal tributaries that enter the Potomac River from Buoy 33 to the mouth of the Potomac River (Buoy 44B.)

5. Chesapeake Bay, Atlantic Ocean, and small coastal basins.

Estuarine waters include the Atlantic Ocean tidal tributaries, and the Chesapeake Bay and its small coastal basins from the Virginia state line to the mouth of the bay (a line from Cape Henry drawn through Buoys 3 and 8 to Fishermans Island), and its tidal tributaries, excluding the Potomac tributaries and those tributaries listed above.

6. Chowan River Basin.

Tidal freshwater includes the Northwest River and its tidal tributaries from the Virginia-North Carolina state line to the

free flowing portion, the Blackwater River and its tidal tributaries from the Virginia-North Carolina state line to the end of tidal waters at approximately state route 611 at river mile 20.90, the Nottoway River and its tidal tributaries from the Virginia-North Carolina state line to the end of tidal waters at approximately Route 674, and the North Landing River and its tidal tributaries from the Virginia-North Carolina state line to the Great Bridge Lock.

Transition zone includes Back Bay and its tributaries in the City of Virginia Beach to the Virginia-North Carolina state line.

D. Site-specific modifications to numerical water quality criteria.

1. The board may consider site-specific modifications to numerical water quality criteria in subsection B of this section where the applicant or permittee demonstrates that the alternate numerical water quality criteria are sufficient to protect all designated uses (see 9 VAC 25-260-10) of that particular surface water segment or body.

2. Any demonstration for site-specific human health criteria shall be restricted to a reevaluation of the bioconcentration or bioaccumulation properties of the pollutant. The exceptions to this restriction are for site-specific criteria for taste, odor, and aesthetic compounds noted by double asterisks in subsection B of this section and nitrates.

3. Site-specific temperature requirements are found in 9 VAC 25-260-90.

4. Procedures for promulgation and review of site-specific modifications to numerical water quality criteria resulting from subdivisions 1 and 2 of this subsection.

a. Proposals describing the details of the site-specific study shall be submitted to the board's staff for approval prior to commencing the study.

b. Any site-specific modification shall be promulgated as a regulation in accordance with the Administrative Process Act. All site-specific modifications shall be listed in 9 VAC 25-260-310 (Special standards and requirements).

E. Variances to water quality standards.

1. A variance from numeric criteria may be granted to a discharger if it can be demonstrated that one or more of the conditions in 9 VAC 25-260-10 G limit the attainment of one or more specific designated uses.

a. Variances shall apply only to the discharger to whom they are granted and shall be reevaluated and either continued, modified or revoked at the time of permit issuance. At that time the permittee shall make a showing that the conditions for granting the variance still apply.

b. Variances shall be described in the public notice published for the permit. The decision to approve a variance shall be subject to the public participation requirements of the Virginia Pollutant Discharge Elimination System (VPDES) Permit Regulation, 9 VAC 25-31 (Permit Regulation).

c. Variances shall not prevent the maintenance and protection of existing uses or exempt the discharger or regulated activity from compliance with other appropriate technology or water quality-based limits or best management practices.

d. Variances granted under this section shall not apply to new discharges.

e. Variances shall be submitted by the department's Division of Scientific Research or its successors to the Environmental Protection Agency for review and approval/disapproval.

f. A list of variances granted shall be maintained by the department's Division of Scientific Research or its successors.

2. None of the variances in subsection E of this section shall apply to the halogen ban section 9 VAC 25-260-110 or temperature criteria in 9 VAC 25-260-50 if superseded by § 316a of the Clean Water Act requirements. No variances in subsection E of this section shall apply to the criteria that are designed to protect human health from carcinogenic and noncarcinogenic toxic effects subsection B of this section with the exception of the metals, and the taste, odor, and aesthetic compounds noted by double asterisks and nitrates, listed in subsection B of this section.

F. Water effect ratio.

1. A water effects ratio (WER) shall be determined by measuring the effect of receiving water (as it is or will be affected by any discharges) on the bioavailability or toxicity of a metal by using standard test organisms and a

metal to conduct toxicity tests simultaneously in receiving water and laboratory water. The ratio of toxicities of the metal(s) in the two waters is the WER (toxicity in receiving water divided by toxicity in laboratory water = WER. Once an acceptable WER for a metal is established, the numerical value for the metal in subsection B of this section is multiplied by the WER to produce an instream concentration that will protect designated uses. This instream concentration shall be utilized in permitting decisions.

2. The WER shall be assigned a value of 1.0 unless the applicant or permittee demonstrates to the department's satisfaction in a permit proceeding that another value is appropriate, or unless available data allow the department to compute a WER for the receiving waters. The applicant or permittee is responsible for proposing and conducting the study to develop a WER. The study may require multiple testing over several seasons. The applicant or permittee shall obtain the department's Division of Scientific Research or its successor approval of the study protocol and the final WER.

3. The Permit Regulation at 9 VAC 25-31-230 C requires that permit limits for metals be expressed as total recoverable measurements. To that end, the study used to establish the WER may be based on total recoverable measurements of the metals.

4. The Environmental Protection Agency views the WER in any particular case as a site-specific criterion. Therefore, the department's Division of Scientific Research or its successor shall submit the results of the study to the Environmental Protection Agency for review and approval/disapproval within 30 days of the receipt of certification from the state's Office of the Attorney General. Nonetheless, the WER is established in a permit proceeding, shall be described in the public notice associated with the permit proceeding, and applies only to the applicant or permittee in that proceeding. The department's action to approve or disapprove a WER is a case decision, not an amendment to the present regulation.

The decision to approve or disapprove a WER shall be subject to the public participation requirements of the Permit Regulation, 9 VAC 25-31-260 et seq. A list of final WERs will be maintained by the department's Division of Scientific Research or its successor.

5. A WER shall not be used for the freshwater and saltwater chronic mercury criteria or the freshwater acute and chronic selenium criteria.

9 VAC 25-260-150. (Repealed.)

9 VAC 25-260-155. Ammonia surface water quality criteria.

A. The one-hour average concentration of total ammonia nitrogen (in mg N/L) in freshwater shall not exceed, more than once every three years on the average[1], the acute criteria below:

Acute Ammonia Freshwater Criteria
Total Ammonia Nitrogen (mg N/L)

pH	Trout Present	Trout Absent
6.5	32.6	48.8
6.6	31.3	46.8
6.7	29.8	44.6
6.8	28.1	42.0
6.9	26.2	39.1
7.0	24.1	36.1
7.1	22.0	32.8
7.2	19.7	29.5
7.3	17.5	26.2
7.4	15.4	23.0
7.5	13.3	19.9
7.6	11.4	17.0
7.7	9.65	14.4
7.8	8.11	12.1
7.9	6.77	10.1
8.0	5.62	8.40
8.1	4.64	6.95
8.2	3.83	5.72
8.3	3.15	4.71
8.4	2.59	3.88
8.5	2.14	3.20
8.6	1.77	2.65
8.7	1.47	2.20
8.8	1.23	1.84
8.9	1.04	1.56
9.0	0.885	1.32

The acute criteria for trout present shall apply to all Class V -Stockable Trout Waters and Class VI -Natural Trout Waters as listed in 9 VAC 25-260-390 through 9 VAC 25-260-540.

To calculate total ammonia nitrogen acute criteria values in freshwater at different pH values than those listed in this subsection, use the following formulas:

Where trout are present:

$$\text{Acute Criterion Concentration (mg N/L)} = \frac{0.275}{(1 + 10^{7.204-pH})} + \frac{39.0}{(1 + 10^{pH-7.204})}$$

Or where trout are absent:

$$\text{Acute Criterion Concentration (mg N/L)} = \frac{0.411}{(1 + 10^{7.204-pH})} + \frac{58.4}{(1 + 10^{pH-7.204})}$$

[1]The default design flow for calculating steady state waste load allocations for the acute ammonia criterion is the 1Q10 (see 9 VAC 25-260-140 B footnote 6) unless statistically valid methods are employed which demonstrate compliance with the duration and return frequency of the water quality criteria.

B. The thirty-day average concentration of total ammonia nitrogen (in mg N/L) where early life stages of fish are present in freshwater shall not exceed, more than once every three years on the average[2], the chronic criteria below:

Chronic Ammonia Freshwater Criteria
Early Life Stages of Fish Present
Total Ammonia Nitrogen (mg N/L)

pH	Temperature (°C)									
	0	14	16	18	20	22	24	26	28	30
6.5	6.67	6.67	6.06	5.33	4.68	4.12	3.62	3.18	2.80	2.46
6.6	6.57	6.57	5.97	5.25	4.61	4.05	3.56	3.13	2.75	2.42
6.7	6.44	6.44	5.86	5.15	4.52	3.98	3.50	3.07	2.70	2.37
6.8	6.29	6.29	5.72	5.03	4.42	3.89	3.42	3.00	2.64	2.32
6.9	6.12	6.12	5.56	4.89	4.30	3.78	3.32	2.92	2.57	2.25
7.0	5.91	5.91	5.37	4.72	4.15	3.65	3.21	2.82	2.48	2.18
7.1	5.67	5.67	5.15	4.53	3.98	3.50	3.08	2.70	2.38	2.09
7.2	5.39	5.39	4.90	4.31	3.78	3.33	2.92	2.57	2.26	1.99
7.3	5.08	5.08	4.61	4.06	3.57	3.13	2.76	2.42	2.13	1.87
7.4	4.73	4.73	4.30	3.78	3.32	2.92	2.57	2.26	1.98	1.74
7.5	4.36	4.36	3.97	3.49	3.06	2.69	2.37	2.08	1.83	1.61
7.6	3.98	3.98	3.61	3.18	2.79	2.45	2.16	1.90	1.67	1.47
7.7	3.58	3.58	3.25	2.86	2.51	2.21	1.94	1.71	1.50	1.32
7.8	3.18	3.18	2.89	2.54	2.23	1.96	1.73	1.52	1.33	1.17
7.9	2.80	2.80	2.54	2.24	1.96	1.73	1.52	1.33	1.17	1.03
8.0	2.43	2.43	2.21	1.94	1.71	1.50	1.32	1.16	1.02	0.897
8.1	2.10	2.10	1.91	1.68	1.47	1.29	1.14	1.00	0.879	0.773
8.2	1.79	1.79	1.63	1.43	1.26	1.11	0.973	0.855	0.752	0.661
8.3	1.52	1.52	1.39	1.22	1.07	0.941	0.827	0.727	0.639	0.562
8.4	1.29	1.29	1.17	1.03	0.906	0.796	0.700	0.615	0.541	0.475
8.5	1.09	1.09	0.990	0.870	0.765	0.672	0.591	0.520	0.457	0.401
8.6	0.920	0.920	0.836	0.735	0.646	0.568	0.499	0.439	0.386	0.339
8.7	0.778	0.778	0.707	0.622	0.547	0.480	0.422	0.371	0.326	0.287
8.8	0.661	0.661	0.601	0.528	0.464	0.408	0.359	0.315	0.277	0.244
8.9	0.565	0.565	0.513	0.451	0.397	0.349	0.306	0.269	0.237	0.208
9.0	0.486	0.486	0.442	0.389	0.342	0.300	0.264	0.232	0.204	0.179

To calculate total ammonia nitrogen chronic criteria values in freshwater when fish early life stages are present at different pH and temperature values than those listed in this subsection, use the following formulas:

$$\text{Chronic Criteria Concentration} = \left(\frac{0.0577}{1 + 10^{7.688-pH}} + \frac{2.487}{1 + 10^{pH-7.688}} \right) \times \text{MIN}$$

Where MIN = 2.85 or $1.45 \times 10^{0.028(25-T)}$, whichever is less.
T = temperature in °C

[2] The default design flow for calculating steady state waste load allocations for the chronic ammonia criterion where early life stages of fish are present is the 30Q10 (see 9 VAC 25-260-140 B footnote 6) unless statistically valid methods are employed which demonstrate compliance with the duration and return frequency of the water quality criteria.

C. The thirty-day average concentration of total ammonia nitrogen (in mg N/L) where early life stages of fish are absent (procedures for making this determination are in subdivisions1 through 4 of this subsection), in freshwater shall not exceed, more than once every three years on the average[3], the chronic criteria below:

Chronic Ammonia Freshwater Criteria
Early Life Stages of Fish Absent
Total Ammonia Nitrogen (mg N/L)

	Temperature (C^o)									
pH	0-7	8	9	10	11	12	13	14	15	16
6.5	10.8	10.1	9.51	8.92	8.36	7.84	7.35	6.89	6.46	6.06
6.6	10.7	9.99	9.37	8.79	8.24	7.72	7.24	6.79	6.36	5.97
6.7	10.5	9.81	9.20	8.62	8.08	7.58	7.11	6.66	6.25	5.86
6.8	10.2	9.58	8.98	8.42	7.90	7.40	6.94	6.51	6.10	5.72
6.9	9.93	9.31	8.73	8.19	7.68	7.20	6.75	6.33	5.93	5.56
7.0	9.60	9.00	8.43	7.91	7.41	6.95	6.52	6.11	5.73	5.37
7.1	9.20	8.63	8.09	7.58	7.11	6.67	6.25	5.86	5.49	5.15
7.2	8.75	8.20	7.69	7.21	6.76	6.34	5.94	5.57	5.22	4.90
7.3	8.24	7.73	7.25	6.79	6.37	5.97	5.60	5.25	4.92	4.61
7.4	7.69	7.21	6.76	6.33	5.94	5.57	5.22	4.89	4.59	4.30
7.5	7.09	6.64	6.23	5.84	5.48	5.13	4.81	4.51	4.23	3.97
7.6	6.46	6.05	5.67	5.32	4.99	4.68	4.38	4.11	3.85	3.61
7.7	5.81	5.45	5.11	4.79	4.49	4.21	3.95	3.70	3.47	3.25
7.8	5.17	4.84	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89
7.9	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89	2.71	2.54
8.0	3.95	3.70	3.47	3.26	3.05	2.86	2.68	2.52	2.36	2.21
8.1	3.41	3.19	2.99	2.81	2.63	2.47	2.31	2.17	2.03	1.91
8.2	2.91	2.73	2.56	2.40	2.25	2.11	1.98	1.85	1.74	1.63
8.3	2.47	2.32	2.18	2.04	1.91	1.79	1.68	1.58	1.48	1.39
8.4	2.09	1.96	1.84	1.73	1.62	1.52	1.42	1.33	1.25	1.17
8.5	1.77	1.66	1.55	1.46	1.37	1.28	1.20	1.13	1.06	0.990
8.6	1.49	1.40	1.31	1.23	1.15	1.08	1.01	0.951	0.892	0.836
8.7	1.26	1.18	1.11	1.04	0.976	0.915	0.858	0.805	0.754	0.707
8.8	1.07	1.01	0.944	0.885	0.829	0.778	0.729	0.684	0.641	0.601
8.9	0.917	0.860	0.806	0.756	0.709	0.664	0.623	0.584	0.548	0.513
9.0	0.790	0.740	0.694	0.651	0.610	0.572	0.536	0.503	0.471	0.442

At 15°C and above, the criterion for fish early life stages absent is the same as the criterion for fish early life stages present.

To calculate total ammonia nitrogen chronic criteria values in freshwater when fish early life stages are absent at different pH and temperature values than those listed in this subsection, use the following formulas:

$$\text{Chronic Criteria Concentration} = \left(\frac{0.0577}{1 + 10^{7.688-pH}} + \frac{2.487}{1 + 10^{pH-7.688}} \right) \times 1.45(10^{0.028(25-MAX)})$$

MAX = temperature in ° C or 7, whichever is greater.

[3]The default design flow for calculating steady state waste load allocations for the chronic ammonia criterion where early life stages of fish are absent is the 30Q10 (see 9 VAC 25-260-140 B footnote 6), unless statistically valid methods are employed which demonstrate compliance with the duration and return frequency of the water quality criteria.

1. Site-specific modifications to the ambient water quality criteria for ammonia to account for the absence of early life stages of fish shall be conducted in accordance with the procedures contained in this subdivision. Because the Department presumes that most state waterbodies have early life stages of fish present during most times of the year, the criteria shall be calculated assuming early life stages of fish are present using subsection B of this section unless the following demonstration that early life stages are absent is successfully completed. Early life stages of

fish are defined in subdivision 2 of this subsection. Modifications to the ambient water quality criteria for ammonia based on the presence or absence of early life stages of fish shall only apply at temperatures below 15°C.

a. During the review of any new or existing activity that has a potential to discharge ammonia in amounts that may cause or contribute to a violation of the ammonia criteria contained in subsection B of this section, the Department may examine data from the following approved sources in subdivisions 1 a (1) through (5) of this subsection or may require the gathering of data in accordance with subdivisions 1 a (1) through (5) on the presence or absence of early life stages of fish in the affected waterbody.

(1) Species and distribution data contained in the Virginia Department of Game and Inland Fisheries Wildlife Information System database.

(2) Species and distribution data contained in *Freshwater Fishes of Virginia,* 1994.

(3) Data and fish species distribution maps contained in *Handbook for Fishery Biology, Volume 3, 1997*.

(4) Field data collected in accordance with U.S. EPA's *Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers,* Second Edition, EPA 841-B-99-002. Field data must comply with all quality assurance/quality control criteria.

(5) *The American Society for Testing and Materials (ASTM) Standard E-1241-88, Standard Guide for Conducting Early Life-Stage Toxicity Tests with Fishes.*

b. If data or information from sources other than subdivisions 1 a (1) through (5) of this subsection are considered, then any resulting site-specific criteria modifications shall be reviewed and adopted in accordance with the site-specific criteria provisions in 9 VAC 25-260-140 D, and submitted to EPA for review and approval.

c. If the Department determines that the data and information obtained from subdivisions 1 a (1) through (5) of this subsection demonstrate that there are periods of each year when no early life stages are expected to be present for any species of fish that occur at the site, the Department shall issue a notice to the public and make available for public comment the supporting data and analysis along with the Department's preliminary decision to authorize the site-specific modification to the ammonia criteria. Such information shall include, at a minimum:

(1) Sources of data and information.

(2) List of fish species that occur at the site as defined by subdivision 3 of this subsection.

(3) Definition of the site. Definition of a "site" can vary in geographic size from a stream segment to a watershed to an entire eco-region.

(4) Duration of early life stage for each species in subdivision 1 c (2) of this subsection.

(5) Dates when early life stages of fish are expected to be present for each species in subdivision 1 c (2) of this subsection.

(6) Based on subdivision 1 c (5) of this subsection, identify the dates (beginning date, ending date), if any, where no early life stages are expected to be present for any of the species identified in subdivision 1 c (2) of this subsection.

d. If, after reviewing the public comments received in subdivision 1 c of this subsection and supporting data and information, the department determines that there are times of the year where no early life stages are expected to be present for any fish species that occur at the site, then the applicable ambient water quality criteria for ammonia for those time periods shall be calculated using the table in this subsection or the formula for calculating the chronic criterion concentration for ammonia when fish early life stages are absent.

e. The department shall maintain a comprehensive list of all sites where the department has determined that early life stages of fish are absent. For each site the list will identify the waterbodies affected and the corresponding times of the year that early life stages are absent. This list is available either upon request from the Office of Water Quality Programs at 629 E. Main Street, Richmond, VA, 23219 or from the department website http://deq.state.va.us/wqs/ .

2. The duration of the "early life stages" extends from the beginning of spawning through the end of the early life stages. The early life stages include the pre-hatch embryonic period, the post-hatch free embryo or yolk-sac fry, and the larval period, during which the organism feeds. Juvenile fish, which are anatomically similar to adults, are not considered an early life stage. The duration of early life stages can vary according to fish species. The Department considers the sources of information in subdivisions 1 a (1) through (5) of this subsection to be the only acceptable sources of information for determining the duration of early life stages of fish under this procedure.

3. "Occur at the site" includes the species, genera, families, orders, classes, and phyla that: are usually present at the site; are present at the site only seasonally due to migration; are present intermittently because they periodically return to or extend their ranges into the site; were present at the site in the past or are present in nearby bodies of water, but are not currently present at the site due to degraded conditions, and are expected to return to the site when conditions improve. Occur at the site does not include taxa that were once present at the site but cannot exist at the site now due to permanent physical alteration of the habitat at the site.

4. Any modifications to ambient water quality criteria for ammonia in subdivision 1 of this subsection shall not likely jeopardize the continued existence of any federal or state listed, threatened or endangered species or result in the destruction or adverse modification of such species' critical habitat.

D. The one-hour average concentration of total ammonia nitrogen (in mg N/L) in saltwater shall not exceed, more than once every three years on the average, the acute criteria below:

Acute Ammonia Saltwater Criteria
Total Ammonia Nitrogen (mg N/L)

Salinity = 10 g/kg
Temperature º C

pH	0	5	10	15	20	25	30	35
7.00	231.9	159.8	110.1	75.88	52.31	36.08	24.91	17.21
7.20	146.4	100.9	69.54	47.95	33.08	22.84	15.79	10.93
7.40	92.45	63.73	43.94	30.32	20.94	14.48	10.03	6.97
7.60	58.40	40.28	27.80	19.20	13.28	9.21	6.40	4.47
7.80	36.92	25.48	17.61	12.19	8.45	5.88	4.11	2.89
8.00	23.37	16.15	11.18	7.76	5.40	3.78	2.66	1.89
8.20	14.81	10.26	7.13	4.97	3.48	2.46	1.75	1.27
8.40	9.42	6.54	4.57	3.20	2.27	1.62	1.18	0.87
8.60	6.01	4.20	2.95	2.09	1.50	1.09	0.81	0.62
8.80	3.86	2.72	1.93	1.39	1.02	0.76	0.58	0.46
9.00	2.51	1.79	1.29	0.95	0.71	0.55	0.44	0.36

Salinity = 20 g/kg
Temperature º C

pH	0	5	10	15	20	25	30	35
7.00	247.6	170.5	117.5	80.98	55.83	38.51	26.58	18.36

7.20	156.3	107.7	74.21	51.17	35.30	24.37	16.84	11.66
7.40	98.67	68.01	46.90	32.35	22.34	15.44	10.70	7.43
7.60	62.33	42.98	29.66	20.48	14.17	9.82	6.82	4.76
7.80	39.40	27.19	18.78	13.00	9.01	6.26	4.37	3.07
8.00	24.93	17.23	11.92	8.27	5.76	4.02	2.83	2.01
8.20	15.80	10.94	7.59	5.29	3.70	2.61	1.86	1.34
8.40	10.04	6.97	4.86	3.41	2.41	1.72	1.24	0.91
8.60	6.41	4.47	3.14	2.22	1.59	1.15	0.85	0.65
8.80	4.11	2.89	2.05	1.47	1.07	0.80	0.61	0.48
9.00	2.67	1.90	1.36	1.00	0.75	0.57	0.46	0.37

Salinity = 30 g/kg

Temperature ° C

pH	0	5	10	15	20	25	30	35
7.00	264.6	182.3	125.6	86.55	59.66	41.15	28.39	19.61
7.20	167.0	115.1	79.31	54.68	37.71	26.03	17.99	12.45
7.40	105.5	72.68	50.11	34.57	23.87	16.50	11.42	7.92
7.60	66.61	45.93	31.69	21.88	15.13	10.48	7.28	5.07
7.80	42.10	29.05	20.07	13.88	9.62	6.68	4.66	3.27
8.00	26.63	18.40	12.73	8.83	6.14	4.29	3.01	2.13
8.20	16.88	11.68	8.10	5.64	3.94	2.78	1.97	1.42
8.40	10.72	7.44	5.18	3.63	2.56	1.82	1.31	0.96
8.60	6.83	4.77	3.34	2.36	1.69	1.22	0.90	0.68
8.80	4.38	3.08	2.18	1.56	1.13	0.84	0.64	0.50
9.00	2.84	2.01	1.45	1.06	0.79	0.60	0.47	0.39

To calculate total ammonia nitrogen acute criteria values in saltwater at different pH and temperature values than those listed in this subsection, use the following formulas:

$$I = \frac{19.9273S}{(1000 - 1.005109S)}$$

Where I = molal ionic strength of water

S = Salinity ppt (g/kg)

The regression model used to relate I to pKa (negative log of the ionization constant) is
pKa = 9.245 + 0.138 I

pKa as defined by these equations is at 298 degrees Kelvin (25°C).
T ° Kelvin = ° C + 273

To correct for other temperatures:
$pKa^{S}_{T} = pKa^{S}_{298} + .0324(298 - T\ ° Kelvin)$

The unionized ammonia fraction (UIA) is given by:

$$UIA = \frac{1}{1+10^{(pKa^{S}_{T} - pH)}}$$

The acute ammonia criterion in saltwater is given by:

$$Acute = \frac{.233}{UIA}$$

Multiply the acute value by .822 to get the ammonia-N acute criterion.

D. The thirty-day average concentration of total ammonia nitrogen (in mg N/L) in saltwater shall not exceed, more than once every three years on the average, the chronic criteria below:

Chronic Ammonia Saltwater Criteria
Total Ammonia Nitrogen (mg N/L)

Salinity = 10 g/kg
Temperature ° C

pH	0	5	10	15	20	25	30	35
7.00	34.84	24.00	16.54	11.40	7.86	5.42	3.74	2.59
7.20	21.99	15.15	10.45	7.20	4.97	3.43	2.37	1.64
7.40	13.89	9.57	6.60	4.55	3.15	2.18	1.51	1.05
7.60	8.77	6.05	4.18	2.88	2.00	1.38	0.96	0.67
7.80	5.55	3.83	2.65	1.83	1.27	0.88	0.62	0.43
8.00	3.51	2.43	1.68	1.17	0.81	0.57	0.40	0.28
8.20	2.23	1.54	1.07	0.75	0.52	0.37	0.26	0.19
8.40	1.41	0.98	0.69	0.48	0.34	0.24	0.18	0.13
8.60	0.90	0.63	0.44	0.31	0.23	0.16	0.12	0.09
8.80	0.58	0.41	0.29	0.21	0.15	0.11	0.09	0.07
9.00	0.38	0.27	0.19	0.14	0.11	0.08	0.07	0.05

Salinity = 20 g/kg
Temperature ° C

pH	0	5	10	15	20	25	30	35
7.00	37.19	25.62	17.65	12.16	8.39	5.78	3.99	2.76
7.20	23.47	16.17	11.15	7.69	5.30	3.66	2.53	1.75
7.40	14.82	10.22	7.04	4.86	3.36	2.32	1.61	1.12
7.60	9.36	6.46	4.46	3.08	2.13	1.47	1.02	0.71
7.80	5.92	4.08	2.82	1.95	1.35	0.94	0.66	0.46
8.00	3.74	2.59	1.79	1.24	0.86	0.60	0.43	0.30
8.20	2.37	1.64	1.14	0.79	0.56	0.39	0.28	0.20
8.40	1.51	1.05	0.73	0.51	0.36	0.26	0.19	0.14
8.60	0.96	0.67	0.47	0.33	0.24	0.17	0.13	0.10
8.80	0.62	0.43	0.31	0.22	0.16	0.12	0.09	0.07
9.00	0.40	0.28	0.20	0.15	0.11	0.09	0.07	0.06

Salinity = 30 g/kg
Temperature ° C

pH	0	5	10	15	20	25	30	35
7.00	39.75	27.38	18.87	13.00	8.96	6.18	4.27	2.95
7.20	25.09	17.29	11.91	8.21	5.67	3.91	2.70	1.87
7.40	15.84	10.92	7.53	5.19	3.59	2.48	1.72	1.19
7.60	10.01	6.90	4.76	3.29	2.27	1.57	1.09	0.76
7.80	6.32	4.36	3.01	2.08	1.44	1.00	0.70	0.49
8.00	4.00	2.76	1.91	1.33	0.92	0.64	0.45	0.32
8.20	2.53	1.75	1.22	0.85	0.59	0.42	0.30	0.21
8.40	1.61	1.12	0.78	0.55	0.38	0.27	0.20	0.14

8.60	1.03	0.72	0.50	0.35	0.25	0.18	0.14	0.10
8.80	0.66	0.46	0.33	0.23	0.17	0.13	0.10	0.08
9.00	0.43	0.30	0.22	0.16	0.12	0.09	0.07	0.06

To calculate total ammonia nitrogen acute criteria values in saltwater at different pH and temperature values than those listed in this subsection, use the following formulas:

$$I = \frac{19.9273S}{(1000-1.005109S)}$$

Where I = molal ionic strength of water

S = Salinity ppt (g/kg)

The regression model used to relate I to pKa (negative log of the ionization constant) is
pKa = 9.245 + .138I

pKa as defined by these equations is at 298 degrees Kelvin (25°C).
T ° Kelvin = ° C + 273

To correct for other temperatures:
$pKa^{S}_{T} = pKa^{S}_{298} + .0324(298 - T\ ^\circ \text{Kelvin})$

The unionized ammonia fraction (UIA) is given by:

$$UIA = \frac{1}{1+10^{(pKa^{S}_{T} - pH)}}$$

The chronic ammonia criterion is saltwater is given by:

$$Chronic = \frac{.035}{UIA}$$

Multiply the chronic value by .822 to get the ammonia-N chronic criterion.

PART II

STANDARDS WITH MORE SPECIFIC APPLICATION

9 VAC 25-260-160. Fecal coliform bacteria; shellfish waters.

In all open ocean or estuarine waters capable of propagating shellfish or in specific areas where public or leased private shellfish beds are present, and including those waters on which condemnation or restriction classifications are established by the State Department of Health, the following criteria for fecal coliform bacteria shall apply:

The geometric mean fecal coliform value for a sampling station shall not exceed an MPN (most probable number) of 14 per 100 milliliters. The 90th percentile shall not exceed an MPN of 43 for a 5-tube, 3-dilution test or 49 for a 3-tube, 3-dilution test.

9 VAC 25-260-170. Bacteria; other waters.

A. In surface waters, except shellfish waters and certain waters identified in subsections B and C of this section, the following criteria shall apply to protect primary contact recreational uses:

1. Fecal coliform bacteria shall not exceed a geometric mean of 200 fecal coliform bacteria per 100 ml of water for two or more samples over a calendar month nor shall more than 10% of the total samples taken during any calendar month exceed 400 fecal coliform bacteria per 100 ml of water. This criterion shall not apply for a sampling station after the bacterial indicators described in subdivision 2 of this subsection have a minimum of 12 data points or after June 30, 2008, whichever comes first.

2. *E. coli* and enterococci bacteria per 100 ml of water shall not exceed the following:

	Geometric Mean[1]	Single Sample Maximum[2]
Freshwater[3]		
E.coli	126	235
Saltwater and Transition Zone[3]		
enterococci	35	104

[1] For two or more samples taken during any calendar month.
[2] No single sample maximum for enterococci and *E. coli* shall exceed a 75% upper one-sided confidence limit based on a site-specific log standard deviation. If site data are insufficient to establish a site-specific log standard deviation, then 0.4 shall be used as the log standard deviation in freshwater and 0.7 shall be as the log standard deviation in saltwater and transition zone. Values shown are based on a log standard deviation of 0.4 in freshwater and 0.7 in saltwater.
[3] See 9 VAC 25-260-140 C for freshwater and transition zone delineation.

B. Notwithstanding the above, all sewage discharges shall be disinfected to achieve the applicable bacteria concentrations in subsection A 2 of this section prior to discharge.

However, the board, with the advice of the State Department of Health, may determine that reduced or no disinfection of a discharge is appropriate on a seasonal or year-round basis. In making such a determination, the board shall consider the designated uses of these waters and the seasonal nature of those uses. Such determinations will be made during the process of approving, issuing, or reissuing the discharge permit and shall be in conformance with a board approved site-specific use-attainability analysis performed by the permittee. When making a case-by-case determination concerning the appropriate level of disinfection for sewage discharges into these waters, the board shall provide a 45-day public notice period and opportunity for a public hearing.

C. Surface waters, or portions of these, may be designated in accordance with 9 VAC 25-260-10 to protect secondary contact recreation.

1. Sewage discharges to secondary contact recreational waters shall meet the requirements of the disinfection policy set forth in subsection B of this section.
2. In surface waters, except shellfish waters, designated for secondary contact recreation under this subsection, the following bacteria criteria per 100 ml of water shall apply:

Leesburg Water Pollution Control Facility
VA0092282

Monthly Ambient Monitoring Data
Station POT1830 (Sheperdstown)
January 2007 - April 2008

Date	Temperature		Dissolved Oxygen	pH
	°F	°C	mg/L	S.U.
January	41.9	5.5	12.7	7.9
February	33.6	0.9	13.9	7.9
March	37.2	2.9	13.0	7.7
April	56.8	13.8	9.9	7.8
May	64.2	17.9	8.7	7.8
June	78.4	25.8	7.1	8.0
July	82.0	27.8	8.9	7.9
August	81.3	27.4	8.8	8.4
September	77.4	25.2	7.6	8.2
October	74.7	23.7	9.2	8.3
November	57.2	14.0	9.0	7.5
December				
January	44.1	6.7	13.0	7.7
February	40.9	4.9	12.5	7.7
March	43.5	6.4	12.0	7.6
April	54.0	12.2	10.7	7.9

MEAN VALUES:	**14.3**		**7.9**

90th PERCENTILE:	**26.8**		**8.3**

Leesburg Water Pollution Control Facility
VA0092282

Monthly Ambient Monitoring Data
Station POT1184 (Little Falls)
January 2007 - March 2008

Date	Temperature		Dissolved Oxygen	pH
	°F	°C	mg/L	S.U.
January	45.3	7.4	12.2	7.9
February	32.9	0.5	13.2	7.9
March	37.4	3.0	14.6	7.7
April	57.7	14.3	9.5	8.1
May	69.8	21.0	8.1	8.0
June	81.7	27.6	7.2	8.2
July	83.1	28.4	6.8	8.1
August	81.7	27.6	7.3	8.6
September	77.5	25.3	7.1	8.1
October	76.1	24.5	8.2	8.3
November	57.6	14.2	8.9	8.2
December	38.7	3.7	12.4	8.1
January	47.7	8.7	11.8	8.0
February	50.0	10.0	12.3	7.3
March	45.3	7.4		7.1
MEAN VALUES:	**14.9**			**8.0**
90th PERCENTILE:	**27.6**			**8.3**

Leesburg Water Pollution Control Facility
VA0092282

USGS Monitoring Data

Date	Station Number	
	1638500	1646500
	Hardness as Calcium carbonate CaCO3 (mg/L)	
19-Apr-1982	110.0	
9-Feb-1982		88.0
20-Nov-1981	150.0	
18-Sep-1981	150.0	
30-Jun-1981	110.0	
28-Jan-1981	180.0	
24-Nov-1980	170.0	
19-Aug-1980	170.0	
22-Jul-1980	130.0	
6-Jun-1980	120.0	
1-May-1980	84.0	
19-Aug-1965		130.0
9-Aug-1965		120.0

MEAN VALUES:	**137.4**	**112.7**

ENVIRONMENTAL SYSTEMS SERVICE, LTD.

Page: 1

Work Order #: 78522
Contract #:
Customer #: 7668
Customer PO #:

TOWN OF LEESBURG
ATTN: JAY ANDERSON
P.O. BOX 88
LEESBURG, VA 20176

Job Location:
Collected by: CLIENT
Date Received: 01/14/2008

ANALYSIS REPORT

TAG #: 80299 SAMPLE POINT: FINAL SAMPLE DATE: 01/06/2008

Description	Result	Unit	Rpt. Limit	Method	Anlys Date	Time	Ini
Total Hardness	158	mg/l	2	SM 2340C	01/25/08	11:00	JI

TAG #: 80300 SAMPLE POINT: FINAL SAMPLE DATE: 01/07/2008

Description	Result	Unit	Rpt. Limit	Method	Anlys Date	Time	Ini
Total Hardness	157	mg/l	2	SM 2340C	01/25/08	11:00	JI

TAG #: 80301 SAMPLE POINT: FINAL SAMPLE DATE: 01/08/2008

Description	Result	Unit	Rpt. Limit	Method	Anlys Date	Time	Ini
Total Hardness	164	mg/l	2	SM 2340C	01/25/08	11:00	JI

Reviewed by: _____
ESS LAB SERVICES

Report Date: January 30, 2008
VA LAB ID# 00115

REPORT OF OPERATION FOR THE TOWN OF LEESBURG
WATER POLLUTION CONTROL FACILITY

MPDES PERMIT NUMBER MD 0066184

TO: MARYLAND DEPARTMENT OF THE ENVIRONMENT
VIRGINIA DEPARTMENT OF HEALTH - OWP and
DEPARTMENT OF ENVIRONMENTAL QUALITY - WD

MONTH: JANUARY 2007
NUMBER OF DAYS: 31

SIGNED:

R.W.SHOEMAKER, DIRECTOR OF UTILITIES

S.W.CAWTHRON, SUPERINTENDENT - WPCD
VA.CLASS I, NUMBER 00301

REPORT SUMMARY

PARAMETER	TOTAL	AVG	MAX	MIN
RAINFALL	3.46	-	-	-
FLOW	119.937	3.869	5.860	2.136
TEMPERATURE	1824	61	64	58
pH	-	-	6.95	6.65
CONDUCTIVITY	16350	545	675	475
TURBIDITY	74.3	2.7	3.8	1.6
DISSOLVED OXYGEN	278.4	9.0	9.4	8.5
CHLORINE	ND	ND	ND	ND
FECAL COLIFORM	GEOMETRIC MEAN =		2	CFU
TSS	13.3	0.4	0.8	0.2
BOD5	46.1	1.5	2.0	0.8
ORTHO-PHOSPHOROUS	17.9	0.6	1.6	0.2
TOTAL-PHOSPHOROUS	23.8	0.8	1.8	0.3
NITRITE-N	0.2	0.0	0.1	0.0
NITRATE-N	149.5	4.8	6.3	3.3
AMMONIA-N	29.6	1.0	2.8	0.4
TKN-N	46.6	1.5	3.1	1.0
ORGANIC-N	16.9	0.5	1.4	0.0
TOTAL N	196.3	6.3	8.5	4.8

REPORT OF OPERATION FOR THE TOWN OF LEESBURG
WATER POLLUTION CONTROL FACILITY

MPDES PERMIT NUMBER MD 0066184

TO: MARYLAND DEPARTMENT OF THE ENVIRONMENT
VIRGINIA DEPARTMENT OF HEALTH - OWP and
DEPARTMENT OF ENVIRONMENTAL QUALITY - WD

MONTH: FEBRUARY 2007
NUMBER OF DAYS: 28

SIGNED: _____
R.W.SHOEMAKER, DIRECTOR OF UTILITIES

_____
S.W.CAWTHRON, SUPERINTENDENT - WPCD
VA.CLASS I, NUMBER 00301

REPORT SUMMARY

PARAMETER	TOTAL	AVG	MAX	MIN
RAINFALL	2.25	-	-	-
FLOW	105.619	3.772	4.398	3.270
TEMPERATURE	1606	57	59	56
pH	-	-	6.99	6.58
CONDUCTIVITY	16175	578	1050	400
TURBIDITY	66.5	2.6	3.6	0.0
DISSOLVED OXYGEN	262.1	9.4	9.7	8.5
CHLORINE	ND	ND	ND	ND
FECAL COLIFORM	GEOMETRIC MEAN =		1 CFU	
TSS	15.3	0.5	4.0	0.2
BOD5	50.8	1.8	6.4	1.2
ORTHO-PHOSPHOROUS	18.2	0.6	1.6	0.1
TOTAL-PHOSPHOROUS	27.3	1.0	1.8	0.4
NITRITE-N	0.6	0.0	0.1	0.0
NITRATE-N	94.0	3.4	5.0	2.3
AMMONIA-N	35.3	1.3	3.5	0.4
TKN-N	55.4	2.0	4.2	0.7
ORGANIC-N	20.1	0.7	1.7	0.0
TOTAL N	150.0	5.4	7.5	3.7

REPORT OF OPERATION FOR THE TOWN OF LEESBURG
WATER POLLUTION CONTROL FACILITY

MPDES PERMIT NUMBER MD 0066184

TO: MARYLAND DEPARTMENT OF THE ENVIRONMENT
VIRGINIA DEPARTMENT OF HEALTH - OWP and
DEPARTMENT OF ENVIRONMENTAL QUALITY - WD

MONTH: MARCH 2007
NUMBER OF DAYS: 31

SIGNED: R W Shoemaker
R.W.SHOEMAKER, DIRECTOR OF UTILITIES

S W Cawthron
S.W.CAWTHRON, SUPERINTENDENT - WPCD
VA.CLASS I, NUMBER 00301

REPORT SUMMARY

PARAMETER	TOTAL	AVG	MAX	MIN
RAINFALL	3.55	-	-	-
FLOW	133.355	4.302	5.762	3.624
TEMPERATURE	1815	59	63	55
pH	-	-	6.96	6.54
CONDUCTIVITY	7450	532	650	425
DISSOLVED OXYGEN	288.1	9.3	9.8	8.8
CHLORINE	ND	ND	ND	ND
FECAL COLIFORM	GEOMETRIC MEAN =		2 CFU	
TSS	24.7	0.8	1.8	0.4
BOD5	49.0	1.6	2.8	0.4
ORTHO-PHOSPHOROUS	15.1	0.5	1.6	0.0
TOTAL-PHOSPHOROUS	29.4	0.9	2.2	0.3
NITRITE-N	0.9	0.0	0.1	0.0
NITRATE-N	112.1	3.6	4.7	2.0
AMMONIA-N	19.9	0.9	1.7	0.1
TKN-N	44.1	2.0	3.9	1.1
ORGANIC-N	24.2	1.1	2.7	0.1
TOTAL N	122.5	5.6	7.4	4.1

REPORT OF OPERATION FOR THE TOWN OF LEESBURG
WATER POLLUTION CONTROL FACILITY

MPDES PERMIT NUMBER MD 0066184

TO: MARYLAND DEPARTMENT OF THE ENVIRONMENT
VIRGINIA DEPARTMENT OF HEALTH - OWP and
DEPARTMENT OF ENVIRONMENTAL QUALITY - WD

MONTH: APRIL 2007
NUMBER OF DAYS: 30

SIGNED: R.W. Shoemaker

R.W.SHOEMAKER, DIRECTOR OF UTILITIES

S.W. Cawthron

S.W.CAWTHRON, SUPERINTENDENT - WPCD
VA.CLASS I, NUMBER 00301

REPORT SUMMARY

PARAMETER	TOTAL	AVG	MAX	MIN
RAINFALL	2.47	-	-	-
FLOW	116.684	3.889	5.611	3.120
TEMPERATURE	1851	62	65	58
pH	-	-	7.05	6.59
CONDUCTIVITY	0	0	0	0
DISSOLVED OXYGEN	266.8	8.9	9.3	8.4
CHLORINE	ND	ND	ND	ND
FECAL COLIFORM	GEOMETRIC MEAN =		2	CFU
TSS	12.9	0.4	1.0	0.0
BOD5	48.1	1.6	2.6	0.4
ORTHO-PHOSPHOROUS	19.3	0.6	1.3	0.3
TOTAL-PHOSPHOROUS	26.8	0.9	2.4	0.4
NITRITE-N	0.3	0.0	0.1	0.0
NITRATE-N	127.0	4.2	5.6	2.8
AMMONIA-N	31.9	1.1	4.9	0.0
TKN-N	48.8	1.6	5.6	0.8
ORGANIC-N	17.0	0.6	1.3	0.0
TOTAL N	176.1	5.9	9.4	4.3

REPORT OF OPERATION FOR THE TOWN OF LEESBURG
WATER POLLUTION CONTROL FACILITY

MPDES PERMIT NUMBER MD 0066184

TO: MARYLAND DEPARTMENT OF THE ENVIRONMENT
VIRGINIA DEPARTMENT OF HEALTH - OWP and
DEPARTMENT OF ENVIRONMENTAL QUALITY - WD

MONTH: MAY 2007
NUMBER OF DAYS: 31

SIGNED: R.W. Shoemaker

R.W.SHOEMAKER, DIRECTOR OF UTILITIES

S W Cawthron

S.W.CAWTHRON, SUPERINTENDENT - WPCD
VA.CLASS I, NUMBER 00301

REPORT SUMMARY

PARAMETER	TOTAL	AVG	MAX	MIN
RAINFALL	0.65	-	-	-
FLOW	109.049	3.518	3.969	3.062
TEMPERATURE	2107	68	72	65
pH	-	-	7.21	6.66
DISSOLVED OXYGEN	259.2	8.4	9.1	7.0
CHLORINE	ND	ND	ND	ND
FECAL COLIFORM	GEOMETRIC MEAN =		1 CFU	
TSS	15.9	0.5	1.2	0.1
BOD5	48.2	1.6	2.1	1.0
ORTHO-PHOSPHOROUS	30.9	1.0	1.8	0.5
TOTAL-PHOSPHOROUS	35.1	1.1	2.2	0.6
NITRITE-N	0.2	0.0	0.0	0.0
NITRATE-N	142.5	4.6	7.2	1.1
AMMONIA-N	19.9	0.6	1.5	0.1
TKN-N	38.5	1.2	2.4	0.7
ORGANIC-N	18.6	0.6	1.5	0.1
TOTAL N	181.3	5.8	9.6	2.5

REPORT OF OPERATION FOR THE TOWN OF LEESBURG
WATER POLLUTION CONTROL FACILITY

MPDES PERMIT NUMBER MD 0066184

TO: MARYLAND DEPARTMENT OF THE ENVIRONMENT
VIRGINIA DEPARTMENT OF HEALTH - OWP and
DEPARTMENT OF ENVIRONMENTAL QUALITY - WD

MONTH: JUNE 2007
NUMBER OF DAYS: 30

SIGNED:

R.W.SHOEMAKER, DIRECTOR OF UTILITIES

S.W.CAWTHRON, SUPERINTENDENT - WPCD
VA.CLASS I, NUMBER 00301

REPORT SUMMARY

PARAMETER	TOTAL	AVG	MAX	MIN
RAINFALL	0.80	-	-	-
FLOW	103.292	3.443	3.926	2.880
TEMPERATURE	2195	73	76	71
pH	-	-	7.08	6.71
DISSOLVED OXYGEN	239.3	8.0	8.3	7.7
CHLORINE	ND	ND	ND	ND
FECAL COLIFORM	GEOMETRIC MEAN =		1 CFU	
TSS	19.0	0.6	2.0	0.1
BOD5	60.5	2.0	11.3	0.6
ORTHO-PHOSPHOROUS	28.1	0.9	2.9	0.3
TOTAL-PHOSPHOROUS	31.2	1.0	3.0	0.4
NITRITE-N	0.3	0.0	0.1	0.0
NITRATE-N	153.1	5.1	6.7	2.6
AMMONIA-N	14.4	0.5	1.1	0.1
TKN-N	31.1	1.0	2.0	0.6
ORGANIC-N	16.7	0.6	1.7	0.1
TOTAL N	184.5	6.2	8.2	3.4

REPORT OF OPERATION FOR THE TOWN OF LEESBURG
WATER POLLUTION CONTROL FACILITY

MPDES PERMIT NUMBER MD 0066184

TO: MARYLAND DEPARTMENT OF THE ENVIRONMENT
VIRGINIA DEPARTMENT OF HEALTH - OWP and
DEPARTMENT OF ENVIRONMENTAL QUALITY - WD

MONTH: JULY 2007
NUMBER OF DAYS: 31

SIGNED: R.W. Shoemaker

R.W.SHOEMAKER, DIRECTOR OF UTILITIES

S.W. Cawthron

S.W.CAWTHRON, SUPERINTENDENT - WPCD
VA.CLASS I, NUMBER 00301

REPORT SUMMARY

PARAMETER	TOTAL	AVG	MAX	MIN
RAINFALL	1.65	-	-	-
FLOW	102.249	3.298	3.563	3.028
TEMPERATURE	2348	76	77	73
pH	-	-	7.15	6.69
DISSOLVED OXYGEN	238.0	7.7	8.1	7.2
CHLORINE	ND	ND	ND	ND
FECAL COLIFORM	GEOMETRIC MEAN =		3 CFU	
TSS	14.7	0.5	1.4	0.1
BOD5	58.2	1.9	13.3	0.9
ORTHO-PHOSPHOROUS	26.9	0.9	2.2	0.2
TOTAL-PHOSPHOROUS	32.1	1.0	3.5	0.2
NITRITE-N	1.8	0.1	0.1	0.0
NITRATE-N	159.1	5.1	7.0	3.8
AMMONIA-N	18.6	0.6	1.3	0.1
TKN-N	36.3	1.2	1.8	0.3
ORGANIC-N	17.6	0.6	1.1	0.1
TOTAL N	197.1	6.4	8.1	4.9

REPORT OF OPERATION FOR THE TOWN OF LEESBURG
WATER POLLUTION CONTROL FACILITY

MPDES PERMIT NUMBER MD 0066184

TO: MARYLAND DEPARTMENT OF THE ENVIRONMENT
VIRGINIA DEPARTMENT OF HEALTH - OWP and
DEPARTMENT OF ENVIRONMENTAL QUALITY - WD

MONTH: AUGUST 2007
NUMBER OF DAYS: 31

SIGNED:

R.W.SHOEMAKER, DIRECTOR OF UTILITIES

S.W.CAWTHRON, SUPERINTENDENT - WPCD
VA.CLASS I, NUMBER 00301

REPORT SUMMARY

PARAMETER	TOTAL	AVG	MAX	MIN
RAINFALL	2.40	-	-	-
FLOW	109.321	3.526	4.162	3.017
TEMPERATURE	2400	77	79	76
pH	-	-	7.15	6.69
DISSOLVED OXYGEN	231.8	7.5	7.8	7.2
CHLORINE	ND	ND	ND	ND
FECAL COLIFORM	GEOMETRIC MEAN =		2 CFU	
TSS	9.4	0.3	0.7	0.1
BOD5	47.7	1.5	9.5	0.6
ORTHO-PHOSPHOROUS	28.7	0.9	1.8	0.3
TOTAL-PHOSPHOROUS	33.1	1.1	2.1	0.4
NITRITE-N	0.9	0.0	0.1	0.0
NITRATE-N	148.7	4.8	5.9	3.9
AMMONIA-N	18.8	0.6	1.4	0.1
TKN-N	34.7	1.1	2.5	0.4
ORGANIC-N	16.0	0.5	1.3	0.0
TOTAL N	184.3	5.9	7.4	4.8

REPORT OF OPERATION FOR THE TOWN OF LEESBURG
WATER POLLUTION CONTROL FACILITY

MPDES PERMIT NUMBER MD 0066184

TO: MARYLAND DEPARTMENT OF THE ENVIRONMENT
VIRGINIA DEPARTMENT OF HEALTH - OWP and
DEPARTMENT OF ENVIRONMENTAL QUALITY - WD

MONTH: SEPTEMBER 2007
NUMBER OF DAYS: 30

SIGNED:

R.W.SHOEMAKER, DIRECTOR OF UTILITIES

S.W.CAWTHRON, SUPERINTENDENT - WPCD
VA.CLASS I, NUMBER 00301

REPORT SUMMARY

PARAMETER	TOTAL	AVG	MAX	MIN
RAINFALL	1.10	-	-	-
FLOW	107.657	3.589	4.555	2.718
TEMPERATURE	2306	77	78	75
pH	-	-	7.04	6.68
DISSOLVED OXYGEN	220.9	7.4	7.9	7.0
CHLORINE	ND	ND	ND	ND
FECAL COLIFORM	GEOMETRIC MEAN =		2	CFU
TSS	12.7	0.4	0.9	0.1
BOD5	46.5	1.6	2.8	0.5
ORTHO-PHOSPHOROUS	17.4	0.6	1.8	0.1
TOTAL-PHOSPHOROUS	21.2	0.7	2.4	0.2
NITRITE-N	1.7	0.1	0.2	0.0
NITRATE-N	142.7	4.8	6.1	3.5
AMMONIA-N	18.1	0.6	0.8	0.3
TKN-N	31.2	1.0	1.4	0.6
ORGANIC-N	13.2	0.4	1.0	0.1
TOTAL N	175.6	5.9	7.5	4.7

REPORT OF OPERATION FOR THE TOWN OF LEESBURG
WATER POLLUTION CONTROL FACILITY

MPDES PERMIT NUMBER MD 0066184

TO: MARYLAND DEPARTMENT OF THE ENVIRONMENT
VIRGINIA DEPARTMENT OF HEALTH - OWP and
DEPARTMENT OF ENVIRONMENTAL QUALITY - WD

MONTH: OCTOBER 2007
NUMBER OF DAYS: 31

SIGNED:

R.W.SHOEMAKER, DIRECTOR OF UTILITIES

S.W.CAWTHRON, SUPERINTENDENT - WPCD
VA.CLASS I, NUMBER 00301

REPORT SUMMARY

PARAMETER	TOTAL	AVG	MAX	MIN
RAINFALL	4.25	-	-	-
FLOW	116.576	3.761	5.593	2.570
TEMPERATURE	2305	74	77	70
pH	-	-	7.14	6.51
DISSOLVED OXYGEN	235.8	7.6	8.4	7.0
CHLORINE	ND	ND	ND	ND
FECAL COLIFORM	GEOMETRIC MEAN =		1	CFU
TSS	14.9	0.5	0.9	0.2
BOD5	51.1	1.6	3.4	0.9
ORTHO-PHOSPHOROUS	24.9	0.8	2.8	0.1
TOTAL-PHOSPHOROUS	29.2	0.9	3.1	0.2
NITRITE-N	1.1	0.0	0.6	0.0
NITRATE-N	54.5	7.8	11.4	4.0
AMMONIA-N	12.4	0.7	1.7	0.1
TKN-N	19.0	1.1	2.0	0.4
ORGANIC-N	6.5	0.4	1.1	0.1
TOTAL N	39.3	7.9	10.6	5.3

REPORT OF OPERATION FOR THE TOWN OF LEESBURG
WATER POLLUTION CONTROL FACILITY

MPDES PERMIT NUMBER MD 0066184

TO: MARYLAND DEPARTMENT OF THE ENVIRONMENT
VIRGINIA DEPARTMENT OF HEALTH - OWP and
DEPARTMENT OF ENVIRONMENTAL QUALITY - WD

MONTH: NOVEMBER 2007
NUMBER OF DAYS: 30

SIGNED:

R.W.SHOEMAKER, DIRECTOR OF UTILITIES

S.W.CAWTHRON, SUPERINTENDENT - WPCD
VA.CLASS I, NUMBER 00301

REPORT SUMMARY

PARAMETER	TOTAL	AVG	MAX	MIN
RAINFALL	2.36	-	-	-
FLOW	111.114	3.704	4.025	3.228
TEMPERATURE	2040	68	71	66
pH	-	-	7.38	6.61
DISSOLVED OXYGEN	245.5	8.2	8.9	7.2
CHLORINE	ND	ND	ND	ND
FECAL COLIFORM	GEOMETRIC MEAN =		2 CFU	
TSS	10.7	0.4	1.7	0.1
BOD5	31.9	1.1	1.7	0.7
ORTHO-PHOSPHOROUS	10.4	0.3	1.7	0.1
TOTAL-PHOSPHOROUS	13.7	0.5	2.3	0.1
NITRITE-N	0.1	0.0	0.1	0.0
NITRATE-N	80.3	8.0	11.5	5.3
AMMONIA-N	9.0	0.5	1.0	0.1
TKN-N	20.7	1.1	2.0	0.7
ORGANIC-N	11.7	0.7	1.1	0.1
TOTAL N	91.0	9.1	12.3	6.5

REPORT OF OPERATION FOR THE TOWN OF LEESBURG
WATER POLLUTION CONTROL FACILITY

MPDES PERMIT NUMBER MD 0066184

TO: MARYLAND DEPARTMENT OF THE ENVIRONMENT
VIRGINIA DEPARTMENT OF HEALTH - OWP and
DEPARTMENT OF ENVIRONMENTAL QUALITY - WD

MONTH: DECEMBER 2007
NUMBER OF DAYS: 31

SIGNED:

R.W.SHOEMAKER, DIRECTOR OF UTILITIES

S.W.CAWTHRON, SUPERINTENDENT - WPCD
VA.CLASS I, NUMBER 00301

REPORT SUMMARY

PARAMETER	TOTAL	AVG	MAX	MIN
RAINFALL	4.45	-	-	-
FLOW	118.625	3.827	4.406	2.966
TEMPERATURE	1964	63	66	61
pH	-	-	7.26	6.50
DISSOLVED OXYGEN	265.4	8.6	9.2	7.9
CHLORINE	ND	ND	ND	ND
FECAL COLIFORM	GEOMETRIC MEAN =		2 CFU	
TSS	23.4	0.8	5.9	0.0
BOD5	59.2	1.9	13.3	0.6
ORTHO-PHOSPHOROUS	39.87	1.29	2.70	0.16
TOTAL-PHOSPHOROUS	44.54	1.44	2.90	0.26
NITRITE-N	0.08	0.00	0.02	0.00
NITRATE-N	80.83	10.10	15.20	6.04
AMMONIA-N	17.26	0.58	1.26	0.00
TKN-N	37.38	1.21	1.68	0.70
ORGANIC-N	19.00	0.63	1.40	0.28
TOTAL N	88.82	11.10	16.33	6.88

Mixing Zone Predictions for Leesburg WPCF

Effluent Flow = 7.5 MGD
Stream 7Q10 = 627 MGD
Stream 1Q10 = 547 MGD
Stream slope = 0.0002 ft/ft
Stream width = 1000 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = 2.6721 ft
Length = 419436.87 ft
Velocity = .3676ft/sec
Residence Time = 13.2073days

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 15.14% of the 7Q10 is used.

Mixing Zone Predictions @ 1Q10

Depth = 2.4642 ft
Length = 448860.58 ft
Velocity = .3483ft/sec
Residence Time = 357.9399 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than .28% of the 1Q10 is used.

Mixing Zone Predictions for Leesburg WPCF

Effluent Flow = 10 MGD
Stream 7Q10 = 627 MGD
Stream 1Q10 = 547 MGD
Stream slope = 0.0002 ft/ft
Stream width = 1000 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = 2.6785 ft
Length = 418606.89 ft
Velocity = .3681ft/sec
Residence Time = 13.1605days

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 15.2% of the 7Q10 is used.

Mixing Zone Predictions @ 1Q10

Depth = 2.4708 ft
Length = 447845.62 ft
Velocity = .349ft/sec
Residence Time = 356.4905 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than .28% of the 1Q10 is used.

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Leesburg WPCF Permit No.: VA0092282

Receiving Stream: Potomac River Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information			Stream Flows			Mixing Information			Effluent Information		
Mean Hardness (as CaCO3) =	137	mg/L	1Q10 (Annual) =	547	MGD	Annual - 1Q10 Mix =	0.28	%	Mean Hardness (as CaCO3) =	160	mg/L
90% Temperature (Annual) =	27.6	deg C	7Q10 (Annual) =	627	MGD	- 7Q10 Mix =	15.14	%	90% Temp (Annual) =	25	deg C
90% Temperature (Wet season) =		deg C	30Q10 (Annual) =	741	MGD	- 30Q10 Mix =	100	%	90% Temp (Wet season) =		deg C
90% Maximum pH =	8.3	SU	1Q10 (Wet season) =	137021	MGD	Wet Season - 1Q10 Mix =	100	%	90% Maximum pH =	7.6	SU
10% Maximum pH =		SU	30Q10 (Wet season)	31616	MGD	- 30Q10 Mix =	100	%	10% Maximum pH =		SU
Tier Designation (1 or 2) =	1		30Q5 =	27064	MGD				Discharge Flow =	7.5	MGD
Public Water Supply (PWS) Y/N? =	y		Harmonic Mean =		MGD						
Trout Present Y/N? =	n		Annual Average =	6147	MGD						
Early Life Stages Present Y/N? =	y										

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Acenapthene	0	--	--	1.2E+03	2.7E+03	--	--	4.3E+06	9.7E+06	--	--	--	--	--	--	--	--	**--**	**--**	**4.3E+06**	**9.7E+06**
Acrolein	0	--	--	3.2E+02	7.8E+02	--	--	1.2E+06	2.8E+06	--	--	--	--	--	--	--	--	**--**	**--**	**1.2E+06**	**2.8E+06**
Acrylonitrile[C]	0	--	--	5.9E-01	6.6E+00	--	--	5.9E-01	6.6E+00	--	--	--	--	--	--	--	--	**--**	**--**	**5.9E-01**	**6.6E+00**
Aldrin [C]	0	3.0E+00	--	1.3E-03	1.4E-03	3.6E+00	--	1.3E-03	1.4E-03	--	--	--	--	--	--	--	--	**3.6E+00**	**--**	**1.3E-03**	**1.4E-03**
Ammonia-N (mg/l) (Yearly)	0	1.54E+01	6.76E-01	--	--	1.8E+01	6.7E+01	--	--	--	--	--	--	--	--	--	--	**1.8E+01**	**6.7E+01**	**--**	**--**
Ammonia-N (mg/l) (High Flow)	0	4.72E+00	1.53E+00	--	--	8.6E+04	6.4E+03	--	--	--	--	--	--	--	--	--	--	**8.6E+04**	**6.4E+03**	**--**	**--**
Anthracene	0	--	--	9.6E+03	1.1E+05	--	--	3.5E+07	4.0E+08	--	--	--	--	--	--	--	--	**--**	**--**	**3.5E+07**	**4.0E+08**
Antimony	0	--	--	1.4E+01	4.3E+03	--	--	5.1E+04	1.6E+07	--	--	--	--	--	--	--	--	**--**	**--**	**5.1E+04**	**1.6E+07**
Arsenic	o	3.4E+02	1.5E+02	1.0E+01	--	4.1E+02	2.0E+03	3.6E+04	--	--	--	--	--	--	--	--	--	**4.1E+02**	**2.0E+03**	**3.6E+04**	**--**
Barium	0	--	--	2.0E+03	--	--	--	7.2E+06	--	--	--	--	--	--	--	--	--	**--**	**--**	**7.2E+06**	**--**
Benzene [C]	0	--	--	1.2E+01	7.1E+02	--	--	1.2E+01	7.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**1.2E+01**	**7.1E+02**
Benzidine[C]	0	--	--	1.2E-03	5.4E-03	--	--	1.2E-03	5.4E-03	--	--	--	--	--	--	--	--	**--**	**--**	**1.2E-03**	**5.4E-03**
Benzo (a) anthracene [C]	0	--	--	4.4E-02	4.9E-01	--	--	4.4E-02	4.9E-01	--	--	--	--	--	--	--	--	**--**	**--**	**4.4E-02**	**4.9E-01**
Benzo (b) fluoranthene [C]	0	--	--	4.4E-02	4.9E-01	--	--	4.4E-02	4.9E-01	--	--	--	--	--	--	--	--	**--**	**--**	**4.4E-02**	**4.9E-01**
Benzo (k) fluoranthene [C]	0	--	--	4.4E-02	4.9E-01	--	--	4.4E-02	4.9E-01	--	--	--	--	--	--	--	--	**--**	**--**	**4.4E-02**	**4.9E-01**
Benzo (a) pyrene [C]	0	--	--	4.4E-02	4.9E-01	--	--	4.4E-02	4.9E-01	--	--	--	--	--	--	--	--	**--**	**--**	**4.4E-02**	**4.9E-01**
Bis2-Chloroethyl Ether	0	--	--	3.1E-01	1.4E+01	--	--	1.1E+03	5.1E+04	--	--	--	--	--	--	--	--	**--**	**--**	**1.1E+03**	**5.1E+04**
Bis2-Chloroisopropyl Ether	0	--	--	1.4E+03	1.7E+05	--	--	5.1E+06	6.1E+08	--	--	--	--	--	--	--	--	**--**	**--**	**5.1E+06**	**6.1E+08**
Bromoform [C]	0	--	--	4.4E+01	3.6E+03	--	--	4.4E+01	3.6E+03	--	--	--	--	--	--	--	--	**--**	**--**	**4.4E+01**	**3.6E+03**
Butylbenzylphthalate	0	--	--	3.0E+03	5.2E+03	--	--	1.1E+07	1.9E+07	--	--	--	--	--	--	--	--	**--**	**--**	**1.1E+07**	**1.9E+07**
Cadmium	0	6.5E+00	1.5E+00	5.0E+00	--	7.8E+00	2.0E+01	1.8E+04	--	--	--	--	--	--	--	--	--	**7.8E+00**	**2.0E+01**	**1.8E+04**	**--**
Carbon Tetrachloride [C]	0	--	--	2.5E+00	4.4E+01	--	--	2.5E+00	4.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**2.5E+00**	**4.4E+01**
Chlordane [C]	0	2.4E+00	4.3E-03	2.1E-02	2.2E-02	2.9E+00	5.9E-02	2.1E-02	2.2E-02	--	--	--	--	--	--	--	--	**2.9E+00**	**5.9E-02**	**2.1E-02**	**2.2E-02**
Chloride	0	8.6E+05	2.3E+05	2.5E+05	--	1.0E+06	3.1E+06	9.0E+08	--	--	--	--	--	--	--	--	--	**1.0E+06**	**3.1E+06**	**9.0E+08**	**--**
TRC	0	1.9E+01	1.1E+01	--	--	2.3E+01	1.5E+02	--	--	--	--	--	--	--	--	--	--	**2.3E+01**	**1.5E+02**	**--**	**--**
Chlorobenzene	0	--	--	6.8E+02	2.1E+04	--	--	2.5E+06	7.6E+07	--	--	--	--	--	--	--	--	**--**	**--**	**2.5E+06**	**7.6E+07**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Chlorodibromomethane[C]	0	--	--	4.1E+00	3.4E+02	--	--	4.1E+00	3.4E+02	--	--	--	--	--	--	--	--	**--**	**--**	**4.1E+00**	**3.4E+02**
Chloroform [C]	0	--	--	3.5E+02	2.9E+04	--	--	3.5E+02	2.9E+04	--	--	--	--	--	--	--	--	**--**	**--**	**3.5E+02**	**2.9E+04**
2-Chloronaphthalene	0	--	--	1.7E+03	4.3E+03	--	--	6.1E+06	1.6E+07	--	--	--	--	--	--	--	--	**--**	**--**	**6.1E+06**	**1.6E+07**
2-Chlorophenol	0	--	--	1.2E+02	4.0E+02	--	--	4.3E+05	1.4E+06	--	--	--	--	--	--	--	--	**--**	**--**	**4.3E+05**	**1.4E+06**
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	1.0E-01	5.6E-01	--	--	--	--	--	--	--	--	--	--	**1.0E-01**	**5.6E-01**	**--**	**--**
Chromium III	0	8.2E+02	9.7E+01	--	--	9.9E+02	1.3E+03	--	--	--	--	--	--	--	--	--	--	**9.9E+02**	**1.3E+03**	**--**	**--**
Chromium VI	0	1.6E+01	1.1E+01	--	--	1.9E+01	1.5E+02	--	--	--	--	--	--	--	--	--	--	**1.9E+01**	**1.5E+02**	**--**	**--**
Chromium, Total	0	--	--	1.0E+02	--	--	--	3.6E+05	--	--	--	--	--	--	--	--	--	**--**	**--**	**3.6E+05**	**--**
Chrysene [C]	0	--	--	4.4E-02	4.9E-01	--	--	4.4E-02	4.9E-01	--	--	--	--	--	--	--	--	**--**	**--**	**4.4E-02**	**4.9E-01**
Copper	0	2.0E+01	1.2E+01	1.3E+03	--	2.5E+01	1.6E+02	4.7E+06	--	--	--	--	--	--	--	--	--	**2.5E+01**	**1.6E+02**	**4.7E+06**	**--**
Cyanide	0	2.2E+01	5.2E+00	7.0E+02	2.2E+05	2.6E+01	7.1E+01	2.5E+06	7.8E+08	--	--	--	--	--	--	--	--	**2.6E+01**	**7.1E+01**	**2.5E+06**	**7.8E+08**
DDD [C]	0	--	--	8.3E-03	8.4E-03	--	--	8.3E-03	8.4E-03	--	--	--	--	--	--	--	--	**--**	**--**	**8.3E-03**	**8.4E-03**
DDE [C]	0	--	--	5.9E-03	5.9E-03	--	--	5.9E-03	5.9E-03	--	--	--	--	--	--	--	--	**--**	**--**	**5.9E-03**	**5.9E-03**
DDT [C]	0	1.1E+00	1.0E-03	5.9E-03	5.9E-03	1.3E+00	1.4E-02	5.9E-03	5.9E-03	--	--	--	--	--	--	--	--	**1.3E+00**	**1.4E-02**	**5.9E-03**	**5.9E-03**
Demeton	0	--	1.0E-01	--	--	--	1.4E+00	--	--	--	--	--	--	--	--	--	--	**--**	**1.4E+00**	**--**	**--**
Dibenz(a,h)anthracene [C]	0	--	--	4.4E-02	4.9E-01	--	--	4.4E-02	4.9E-01	--	--	--	--	--	--	--	--	**--**	**--**	**4.4E-02**	**4.9E-01**
Dibutyl phthalate	0	--	--	2.7E+03	1.2E+04	--	--	9.7E+06	4.3E+07	--	--	--	--	--	--	--	--	**--**	**--**	**9.7E+06**	**4.3E+07**
Dichloromethane (Methylene Chloride) [C]	0	--	--	4.7E+01	1.6E+04	--	--	4.7E+01	1.6E+04	--	--	--	--	--	--	--	--	**--**	**--**	**4.7E+01**	**1.6E+04**
1,2-Dichlorobenzene	0	--	--	2.7E+03	1.7E+04	--	--	9.7E+06	6.1E+07	--	--	--	--	--	--	--	--	**--**	**--**	**9.7E+06**	**6.1E+07**
1,3-Dichlorobenzene	0	--	--	4.0E+02	2.6E+03	--	--	1.4E+06	9.4E+06	--	--	--	--	--	--	--	--	**--**	**--**	**1.4E+06**	**9.4E+06**
1,4-Dichlorobenzene	0	--	--	4.0E+02	2.6E+03	--	--	1.4E+06	9.4E+06	--	--	--	--	--	--	--	--	**--**	**--**	**1.4E+06**	**9.4E+06**
3,3-Dichlorobenzidine[C]	0	--	--	4.0E-01	7.7E-01	--	--	4.0E-01	7.7E-01	--	--	--	--	--	--	--	--	**--**	**--**	**4.0E-01**	**7.7E-01**
Dichlorobromomethane [C]	0	--	--	5.6E+00	4.6E+02	--	--	5.6E+00	4.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**5.6E+00**	**4.6E+02**
1,2-Dichloroethane [C]	0	--	--	3.8E+00	9.9E+02	--	--	3.8E+00	9.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**3.8E+00**	**9.9E+02**
1,1-Dichloroethylene	0	--	--	3.1E+02	1.7E+04	--	--	1.1E+06	6.1E+07	--	--	--	--	--	--	--	--	**--**	**--**	**1.1E+06**	**6.1E+07**
1,2-trans-dichloroethylene	0	--	--	7.0E+02	1.4E+05	--	--	2.5E+06	5.1E+08	--	--	--	--	--	--	--	--	**--**	**--**	**2.5E+06**	**5.1E+08**
2,4-Dichlorophenol	0	--	--	9.3E+01	7.9E+02	--	--	3.4E+05	2.9E+06	--	--	--	--	--	--	--	--	**--**	**--**	**3.4E+05**	**2.9E+06**
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	1.0E+02	--	--	--	3.6E+05	--	--	--	--	--	--	--	--	--	**--**	**--**	**3.6E+05**	**--**
1,2-Dichloropropane[C]	0	--	--	5.2E+00	3.9E+02	--	--	5.2E+00	3.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**5.2E+00**	**3.9E+02**
1,3-Dichloropropene	0	--	--	1.0E+01	1.7E+03	--	--	3.6E+04	6.1E+06	--	--	--	--	--	--	--	--	**--**	**--**	**3.6E+04**	**6.1E+06**
Dieldrin [C]	0	2.4E-01	5.6E-02	1.4E-03	1.4E-03	2.9E-01	7.6E-01	1.4E-03	1.4E-03	--	--	--	--	--	--	--	--	**2.9E-01**	**7.6E-01**	**1.4E-03**	**1.4E-03**
Diethyl Phthalate	0	--	--	2.3E+04	1.2E+05	--	--	8.3E+07	4.3E+08	--	--	--	--	--	--	--	--	**--**	**--**	**8.3E+07**	**4.3E+08**
Di-2-Ethylhexyl Phthalate [C]	0	--	--	1.8E+01	5.9E+01	--	--	1.8E+01	5.9E+01	--	--	--	--	--	--	--	--	**--**	**--**	**1.8E+01**	**5.9E+01**
2,4-Dimethylphenol	0	--	--	5.4E+02	2.3E+03	--	--	1.9E+06	8.3E+06	--	--	--	--	--	--	--	--	**--**	**--**	**1.9E+06**	**8.3E+06**
Dimethyl Phthalate	0	--	--	3.1E+05	2.9E+06	--	--	1.1E+09	1.0E+10	--	--	--	--	--	--	--	--	**--**	**--**	**1.1E+09**	**1.0E+10**
Di-n-Butyl Phthalate	0	--	--	2.7E+03	1.2E+04	--	--	9.7E+06	4.3E+07	--	--	--	--	--	--	--	--	**--**	**--**	**9.7E+06**	**4.3E+07**
2,4 Dinitrophenol	0	--	--	7.0E+01	1.4E+04	--	--	2.5E+05	5.1E+07	--	--	--	--	--	--	--	--	**--**	**--**	**2.5E+05**	**5.1E+07**
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	7.65E+02	--	--	4.8E+04	2.8E+06	--	--	--	--	--	--	--	--	**--**	**--**	**4.8E+04**	**2.8E+06**
2,4-Dinitrotoluene [C]	0	--	--	1.1E+00	9.1E+01	--	--	1.1E+00	9.1E+01	--	--	--	--	--	--	--	--	**--**	**--**	**1.1E+00**	**9.1E+01**
Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin) (ppq)	0	--	--	1.2E-06	1.2E-06	--	--	9.8E-04	9.8E-04	--	--	--	--	--	--	--	--	**--**	**--**	**9.8E-04**	**9.8E-04**
1,2-Diphenylhydrazine[C]	0	--	--	4.0E-01	5.4E+00	--	--	4.0E-01	5.4E+00	--	--	--	--	--	--	--	--	**--**	**--**	**4.0E-01**	**5.4E+00**
Alpha-Endosulfan	0	2.2E-01	5.6E-02	1.1E+02	2.4E+02	2.6E-01	7.6E-01	4.0E+05	8.7E+05	--	--	--	--	--	--	--	--	**2.6E-01**	**7.6E-01**	**4.0E+05**	**8.7E+05**
Beta-Endosulfan	0	2.2E-01	5.6E-02	1.1E+02	2.4E+02	2.6E-01	7.6E-01	4.0E+05	8.7E+05	--	--	--	--	--	--	--	--	**2.6E-01**	**7.6E-01**	**4.0E+05**	**8.7E+05**
Endosulfan Sulfate	0	--	--	1.1E+02	2.4E+02	--	--	4.0E+05	8.7E+05	--	--	--	--	--	--	--	--	**--**	**--**	**4.0E+05**	**8.7E+05**
Endrin	0	8.6E-02	3.6E-02	7.6E-01	8.1E-01	1.0E-01	4.9E-01	2.7E+03	2.9E+03	--	--	--	--	--	--	--	--	**1.0E-01**	**4.9E-01**	**2.7E+03**	**2.9E+03**
Endrin Aldehyde	0	--	--	7.6E-01	8.1E-01	--	--	2.7E+03	2.9E+03	--	--	--	--	--	--	--	--	**--**	**--**	**2.7E+03**	**2.9E+03**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Ethylbenzene	0	--	--	3.1E+03	2.9E+04	--	--	1.1E+07	1.0E+08	--	--	--	--	--	--	--	--	**--**	**--**	**1.1E+07**	**1.0E+08**
Fluoranthene	0	--	--	3.0E+02	3.7E+02	--	--	1.1E+06	1.3E+06	--	--	--	--	--	--	--	--	**--**	**--**	**1.1E+06**	**1.3E+06**
Fluorene	0	--	--	1.3E+03	1.4E+04	--	--	4.7E+06	5.1E+07	--	--	--	--	--	--	--	--	**--**	**--**	**4.7E+06**	**5.1E+07**
Foaming Agents	0	--	--	5.0E+02	--	--	--	1.8E+06	--	--	--	--	--	--	--	--	--	**--**	**--**	**1.8E+06**	**--**
Guthion	0	--	1.0E-02	--	--	--	1.4E-01	--	--	--	--	--	--	--	--	--	--	**--**	**1.4E-01**	**--**	**--**
Heptachlor [C]	0	5.2E-01	3.8E-03	2.1E-03	2.1E-03	6.3E-01	5.2E-02	2.1E-03	2.1E-03	--	--	--	--	--	--	--	--	**6.3E-01**	**5.2E-02**	**2.1E-03**	**2.1E-03**
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	1.0E-03	1.1E-03	6.3E-01	5.2E-02	1.0E-03	1.1E-03	--	--	--	--	--	--	--	--	**6.3E-01**	**5.2E-02**	**1.0E-03**	**1.1E-03**
Hexachlorobenzene[C]	0	--	--	7.5E-03	7.7E-03	--	--	7.5E-03	7.7E-03	--	--	--	--	--	--	--	--	**--**	**--**	**7.5E-03**	**7.7E-03**
Hexachlorobutadiene[C]	0	--	--	4.4E+00	5.0E+02	--	--	4.4E+00	5.0E+02	--	--	--	--	--	--	--	--	**--**	**--**	**4.4E+00**	**5.0E+02**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	3.9E-02	1.3E-01	--	--	3.9E-02	1.3E-01	--	--	--	--	--	--	--	--	**--**	**--**	**3.9E-02**	**1.3E-01**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	1.4E-01	4.6E-01	--	--	1.4E-01	4.6E-01	--	--	--	--	--	--	--	--	**--**	**--**	**1.4E-01**	**4.6E-01**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	--	1.9E-01	6.3E-01	1.1E+00	--	1.9E-01	6.3E-01	--	--	--	--	--	--	--	--	**1.1E+00**	**--**	**1.9E-01**	**6.3E-01**
Hexachlorocyclopentadiene	0	--	--	2.4E+02	1.7E+04	--	--	8.7E+05	6.1E+07	--	--	--	--	--	--	--	--	**--**	**--**	**8.7E+05**	**6.1E+07**
Hexachloroethane[C]	0	--	--	1.9E+01	8.9E+01	--	--	1.9E+01	8.9E+01	--	--	--	--	--	--	--	--	**--**	**--**	**1.9E+01**	**8.9E+01**
Hydrogen Sulfide	0	--	2.0E+00	--	--	--	2.7E+01	--	--	--	--	--	--	--	--	--	--	**--**	**2.7E+01**	**--**	**--**
Indeno (1,2,3-cd) pyrene [C]	0	--	--	4.4E-02	4.9E-01	--	--	4.4E-02	4.9E-01	--	--	--	--	--	--	--	--	**--**	**--**	**4.4E-02**	**4.9E-01**
Iron	0	--	--	3.0E+02	--	--	--	1.1E+06	--	--	--	--	--	--	--	--	--	**--**	**--**	**1.1E+06**	**--**
Isophorone[C]	0	--	--	3.6E+02	2.6E+04	--	--	3.6E+02	2.6E+04	--	--	--	--	--	--	--	--	**--**	**--**	**3.6E+02**	**2.6E+04**
Kepone	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**--**	**--**
Lead	0	2.1E+02	2.0E+01	1.5E+01	--	2.5E+02	2.8E+02	5.4E+04	--	--	--	--	--	--	--	--	--	**2.5E+02**	**2.8E+02**	**5.4E+04**	**--**
Malathion	0	--	1.0E-01	--	--	--	1.4E+00	--	--	--	--	--	--	--	--	--	--	**--**	**1.4E+00**	**--**	**--**
Manganese	0	--	--	5.0E+01	--	--	--	1.8E+05	--	--	--	--	--	--	--	--	--	**--**	**--**	**1.8E+05**	**--**
Mercury	0	1.4E+00	7.7E-01	5.0E-02	5.1E-02	1.7E+00	1.1E+01	1.8E+02	1.8E+02	--	--	--	--	--	--	--	--	**1.7E+00**	**1.1E+01**	**1.8E+02**	**1.8E+02**
Methyl Bromide	0	--	--	4.8E+01	4.0E+03	--	--	1.7E+05	1.4E+07	--	--	--	--	--	--	--	--	**--**	**--**	**1.7E+05**	**1.4E+07**
Methoxychlor	0	--	3.0E-02	1.0E+02	--	--	4.1E-01	3.6E+05	--	--	--	--	--	--	--	--	--	**--**	**4.1E-01**	**3.6E+05**	**--**
Mirex	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**--**	**--**
Monochlorobenzene	0	--	--	6.8E+02	2.1E+04	--	--	2.5E+06	7.6E+07	--	--	--	--	--	--	--	--	**--**	**--**	**2.5E+06**	**7.6E+07**
Nickel	0	2.7E+02	2.7E+01	6.1E+02	4.6E+03	3.2E+02	3.6E+02	2.2E+06	1.7E+07	--	--	--	--	--	--	--	--	**3.2E+02**	**3.6E+02**	**2.2E+06**	**1.7E+07**
Nitrate (as N)	0	--	--	1.0E+04	--	--	--	3.6E+07	--	--	--	--	--	--	--	--	--	**--**	**--**	**3.6E+07**	**--**
Nitrobenzene	0	--	--	1.7E+01	1.9E+03	--	--	6.1E+04	6.9E+06	--	--	--	--	--	--	--	--	**--**	**--**	**6.1E+04**	**6.9E+06**
N-Nitrosodimethylamine[C]	0	--	--	6.9E-03	8.1E+01	--	--	6.9E-03	8.1E+01	--	--	--	--	--	--	--	--	**--**	**--**	**6.9E-03**	**8.1E+01**
N-Nitrosodiphenylamine[C]	0	--	--	5.0E+01	1.6E+02	--	--	5.0E+01	1.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**5.0E+01**	**1.6E+02**
N-Nitrosodi-n-propylamine[C]	0	--	--	5.0E-02	1.4E+01	--	--	5.0E-02	1.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**5.0E-02**	**1.4E+01**
Parathion	0	6.5E-02	1.3E-02	--	--	7.8E-02	1.8E-01	--	--	--	--	--	--	--	--	--	--	**7.8E-02**	**1.8E-01**	**--**	**--**
PCB-1016	0	--	1.4E-02	--	--	--	1.9E-01	--	--	--	--	--	--	--	--	--	--	**--**	**1.9E-01**	**--**	**--**
PCB-1221	0	--	1.4E-02	--	--	--	1.9E-01	--	--	--	--	--	--	--	--	--	--	**--**	**1.9E-01**	**--**	**--**
PCB-1232	0	--	1.4E-02	--	--	--	1.9E-01	--	--	--	--	--	--	--	--	--	--	**--**	**1.9E-01**	**--**	**--**
PCB-1242	0	--	1.4E-02	--	--	--	1.9E-01	--	--	--	--	--	--	--	--	--	--	**--**	**1.9E-01**	**--**	**--**
PCB-1248	0	--	1.4E-02	--	--	--	1.9E-01	--	--	--	--	--	--	--	--	--	--	**--**	**1.9E-01**	**--**	**--**
PCB-1254	0	--	1.4E-02	--	--	--	1.9E-01	--	--	--	--	--	--	--	--	--	--	**--**	**1.9E-01**	**--**	**--**
PCB-1260	0	--	1.4E-02	--	--	--	1.9E-01	--	--	--	--	--	--	--	--	--	--	**--**	**1.9E-01**	**--**	**--**
PCB Total[C]	0	--	--	1.7E-03	1.7E-03	--	--	1.7E-03	1.7E-03	--	--	--	--	--	--	--	--	**--**	**--**	**1.7E-03**	**1.7E-03**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Pentachlorophenol [C]	0	7.7E-03	5.9E-03	2.8E+00	8.2E+01	9.2E-03	8.0E-02	2.8E+00	8.2E+01	--	--	--	--	--	--	--	--	**9.2E-03**	**8.0E-02**	**2.8E+00**	**8.2E+01**
Phenol	0	--	--	2.1E+04	4.6E+06	--	--	7.6E+07	1.7E+10	--	--	--	--	--	--	--	--	**--**	**--**	**7.6E+07**	**1.7E+10**
Pyrene	0	--	--	9.6E+02	1.1E+04	--	--	3.5E+06	4.0E+07	--	--	--	--	--	--	--	--	**--**	**--**	**3.5E+06**	**4.0E+07**
Radionuclides (pCi/l except Beta/Photon)	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**--**	**--**	**--**	**--**
Gross Alpha Activity	0	--	--	1.5E+01	1.5E+01	--	--	5.4E+04	5.4E+04	--	--	--	--	--	--	--	--	**--**	**--**	**5.4E+04**	**5.4E+04**
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	4.0E+00	--	--	1.4E+04	1.4E+04	--	--	--	--	--	--	--	--	**--**	**--**	**1.4E+04**	**1.4E+04**
Strontium-90	0	--	--	8.0E+00	8.0E+00	--	--	2.9E+04	2.9E+04	--	--	--	--	--	--	--	--	**--**	**--**	**2.9E+04**	**2.9E+04**
Tritium	0	--	--	2.0E+04	2.0E+04	--	--	7.2E+07	7.2E+07	--	--	--	--	--	--	--	--	**--**	**--**	**7.2E+07**	**7.2E+07**
Selenium	0	2.0E+01	5.0E+00	1.7E+02	1.1E+04	2.4E+01	6.8E+01	6.1E+05	4.0E+07	--	--	--	--	--	--	--	--	**2.4E+01**	**6.8E+01**	**6.1E+05**	**4.0E+07**
Silver	0	7.4E+00	--	--	--	8.9E+00	--	--	--	--	--	--	--	--	--	--	--	**8.9E+00**	**--**	**--**	**--**
Sulfate	0	--	--	2.5E+05	--	--	--	9.0E+08	--	--	--	--	--	--	--	--	--	**--**	**--**	**9.0E+08**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	1.7E+00	1.1E+02	--	--	1.7E+00	1.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**1.7E+00**	**1.1E+02**
Tetrachloroethylene[C]	0	--	--	8.0E+00	8.9E+01	--	--	8.0E+00	8.9E+01	--	--	--	--	--	--	--	--	**--**	**--**	**8.0E+00**	**8.9E+01**
Thallium	0	--	--	1.7E+00	6.3E+00	--	--	6.1E+03	2.3E+04	--	--	--	--	--	--	--	--	**--**	**--**	**6.1E+03**	**2.3E+04**
Toluene	0	--	--	6.8E+03	2.0E+05	--	--	2.5E+07	7.2E+08	--	--	--	--	--	--	--	--	**--**	**--**	**2.5E+07**	**7.2E+08**
Total dissolved solids	0	--	--	5.0E+05	--	--	--	1.8E+09	--	--	--	--	--	--	--	--	--	**--**	**--**	**1.8E+09**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	7.3E-03	7.5E-03	8.8E-01	2.7E-03	7.3E-03	7.5E-03	--	--	--	--	--	--	--	--	**8.8E-01**	**2.7E-03**	**7.3E-03**	**7.5E-03**
Tributyltin	0	4.6E-01	6.3E-02	--	--	5.5E-01	8.6E-01	--	--	--	--	--	--	--	--	--	--	**5.5E-01**	**8.6E-01**	**--**	**--**
1,2,4-Trichlorobenzene	0	--	--	2.6E+02	9.4E+02	--	--	9.4E+05	3.4E+06	--	--	--	--	--	--	--	--	**--**	**--**	**9.4E+05**	**3.4E+06**
1,1,2-Trichloroethane[C]	0	--	--	6.0E+00	4.2E+02	--	--	6.0E+00	4.2E+02	--	--	--	--	--	--	--	--	**--**	**--**	**6.0E+00**	**4.2E+02**
Trichloroethylene [C]	0	--	--	2.7E+01	8.1E+02	--	--	2.7E+01	8.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**2.7E+01**	**8.1E+02**
2,4,6-Trichlorophenol [C]	0	--	--	2.1E+01	6.5E+01	--	--	2.1E+01	6.5E+01	--	--	--	--	--	--	--	--	**--**	**--**	**2.1E+01**	**6.5E+01**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	5.0E+01	--	--	--	1.8E+05	--	--	--	--	--	--	--	--	--	**--**	**--**	**1.8E+05**	**--**
Vinyl Chloride[C]	0	--	--	2.3E-01	6.1E+01	--	--	2.3E-01	6.1E+01	--	--	--	--	--	--	--	--	**--**	**--**	**2.3E-01**	**6.1E+01**
Zinc	0	1.7E+02	1.6E+02	9.1E+03	6.9E+04	2.1E+02	2.1E+03	3.3E+07	2.5E+08	--	--	--	--	--	--	--	--	**2.1E+02**	**2.1E+03**	**3.3E+07**	**2.5E+08**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens, Harmonic Mean for Carcinogens, and Annual Average for Dioxin. Mixing ratios may be substituted for stream flows where appropriate.

Metal	Target Value (SSTV)
Antimony	5.1E+04
Arsenic	1.6E+02
Barium	7.2E+06
Cadmium	3.1E+00
Chromium III	4.0E+02
Chromium VI	7.7E+00
Copper	9.8E+00
Iron	1.1E+06
Lead	1.0E+02
Manganese	1.8E+05
Mercury	6.7E-01
Nickel	1.3E+02
Selenium	9.6E+00
Silver	3.6E+00
Zinc	8.2E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Leesburg WPCF Permit No.: VA0092282

Receiving Stream: Potomac River Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information			Stream Flows			Mixing Information			Effluent Information		
Mean Hardness (as CaCO3) =	137	mg/L	1Q10 (Annual) =	547	MGD	Annual - 1Q10 Mix =	0.28	%	Mean Hardness (as CaCO3) =	160	mg/L
90% Temperature (Annual) =	27.6	deg C	7Q10 (Annual) =	627	MGD	- 7Q10 Mix =	15.2	%	90% Temp (Annual) =	25	deg C
90% Temperature (Wet season) =		deg C	30Q10 (Annual) =	741	MGD	- 30Q10 Mix =	100	%	90% Temp (Wet season) =		deg C
90% Maximum pH =	8.3	SU	1Q10 (Wet season) =	137021	MGD	Wet Season - 1Q10 Mix =	100	%	90% Maximum pH =	7.6	SU
10% Maximum pH =		SU	30Q10 (Wet season)	31616	MGD	- 30Q10 Mix =	100	%	10% Maximum pH =		SU
Tier Designation (1 or 2) =	1		30Q5 =	27064	MGD				Discharge Flow =	10	MGD
Public Water Supply (PWS) Y/N? =	y		Harmonic Mean =		MGD						
Trout Present Y/N? =	n		Annual Average =	6147	MGD						
Early Life Stages Present Y/N? =	y										

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Acenapthene	0	--	--	1.2E+03	2.7E+03	--	--	3.2E+06	7.3E+06	--	--	--	--	--	--	--	--	**--**	**--**	**3.2E+06**	**7.3E+06**
Acrolein	0	--	--	3.2E+02	7.8E+02	--	--	8.7E+05	2.1E+06	--	--	--	--	--	--	--	--	**--**	**--**	**8.7E+05**	**2.1E+06**
Acrylonitrile[C]	0	--	--	5.9E-01	6.6E+00	--	--	5.9E-01	6.6E+00	--	--	--	--	--	--	--	--	**--**	**--**	**5.9E-01**	**6.6E+00**
Aldrin [C]	0	3.0E+00	--	1.3E-03	1.4E-03	3.5E+00	--	1.3E-03	1.4E-03	--	--	--	--	--	--	--	--	**3.5E+00**	**--**	**1.3E-03**	**1.4E-03**
Ammonia-N (mg/l) (Yearly)	0	1.57E+01	6.82E-01	--	--	1.8E+01	5.1E+01	--	--	--	--	--	--	--	--	--	--	**1.8E+01**	**5.1E+01**	**--**	**--**
Ammonia-N (mg/l) (High Flow)	0	4.72E+00	1.53E+00	--	--	6.5E+04	4.8E+03	--	--	--	--	--	--	--	--	--	--	**6.5E+04**	**4.8E+03**	**--**	**--**
Anthracene	0	--	--	9.6E+03	1.1E+05	--	--	2.6E+07	3.0E+08	--	--	--	--	--	--	--	--	**--**	**--**	**2.6E+07**	**3.0E+08**
Antimony	0	--	--	1.4E+01	4.3E+03	--	--	3.8E+04	1.2E+07	--	--	--	--	--	--	--	--	**--**	**--**	**3.8E+04**	**1.2E+07**
Arsenic	o	3.4E+02	1.5E+02	1.0E+01	--	3.9E+02	1.6E+03	2.7E+04	--	--	--	--	--	--	--	--	--	**3.9E+02**	**1.6E+03**	**2.7E+04**	**--**
Barium	0	--	--	2.0E+03	--	--	--	5.4E+06	--	--	--	--	--	--	--	--	--	**--**	**--**	**5.4E+06**	**--**
Benzene [C]	0	--	--	1.2E+01	7.1E+02	--	--	1.2E+01	7.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**1.2E+01**	**7.1E+02**
Benzidine[C]	0	--	--	1.2E-03	5.4E-03	--	--	1.2E-03	5.4E-03	--	--	--	--	--	--	--	--	**--**	**--**	**1.2E-03**	**5.4E-03**
Benzo (a) anthracene [C]	0	--	--	4.4E-02	4.9E-01	--	--	4.4E-02	4.9E-01	--	--	--	--	--	--	--	--	**--**	**--**	**4.4E-02**	**4.9E-01**
Benzo (b) fluoranthene [C]	0	--	--	4.4E-02	4.9E-01	--	--	4.4E-02	4.9E-01	--	--	--	--	--	--	--	--	**--**	**--**	**4.4E-02**	**4.9E-01**
Benzo (k) fluoranthene [C]	0	--	--	4.4E-02	4.9E-01	--	--	4.4E-02	4.9E-01	--	--	--	--	--	--	--	--	**--**	**--**	**4.4E-02**	**4.9E-01**
Benzo (a) pyrene [C]	0	--	--	4.4E-02	4.9E-01	--	--	4.4E-02	4.9E-01	--	--	--	--	--	--	--	--	**--**	**--**	**4.4E-02**	**4.9E-01**
Bis2-Chloroethyl Ether	0	--	--	3.1E-01	1.4E+01	--	--	8.4E+02	3.8E+04	--	--	--	--	--	--	--	--	**--**	**--**	**8.4E+02**	**3.8E+04**
Bis2-Chloroisopropyl Ether	0	--	--	1.4E+03	1.7E+05	--	--	3.8E+06	4.6E+08	--	--	--	--	--	--	--	--	**--**	**--**	**3.8E+06**	**4.6E+08**
Bromoform [C]	0	--	--	4.4E+01	3.6E+03	--	--	4.4E+01	3.6E+03	--	--	--	--	--	--	--	--	**--**	**--**	**4.4E+01**	**3.6E+03**
Butylbenzylphthalate	0	--	--	3.0E+03	5.2E+03	--	--	8.1E+06	1.4E+07	--	--	--	--	--	--	--	--	**--**	**--**	**8.1E+06**	**1.4E+07**
Cadmium	0	6.5E+00	1.5E+00	5.0E+00	--	7.5E+00	1.5E+01	1.4E+04	--	--	--	--	--	--	--	--	--	**7.5E+00**	**1.5E+01**	**1.4E+04**	**--**
Carbon Tetrachloride [C]	0	--	--	2.5E+00	4.4E+01	--	--	2.5E+00	4.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**2.5E+00**	**4.4E+01**
Chlordane [C]	0	2.4E+00	4.3E-03	2.1E-02	2.2E-02	2.8E+00	4.5E-02	2.1E-02	2.2E-02	--	--	--	--	--	--	--	--	**2.8E+00**	**4.5E-02**	**2.1E-02**	**2.2E-02**
Chloride	0	8.6E+05	2.3E+05	2.5E+05	--	9.9E+05	2.4E+06	6.8E+08	--	--	--	--	--	--	--	--	--	**9.9E+05**	**2.4E+06**	**6.8E+08**	**--**
TRC	0	1.9E+01	1.1E+01	--	--	2.2E+01	1.2E+02	--	--	--	--	--	--	--	--	--	--	**2.2E+01**	**1.2E+02**	**--**	**--**
Chlorobenzene	0	--	--	6.8E+02	2.1E+04	--	--	1.8E+06	5.7E+07	--	--	--	--	--	--	--	--	**--**	**--**	**1.8E+06**	**5.7E+07**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Chlorodibromomethane[C]	0	--	--	4.1E+00	3.4E+02	--	--	4.1E+00	3.4E+02	--	--	--	--	--	--	--	--	**--**	**--**	**4.1E+00**	**3.4E+02**
Chloroform [C]	0	--	--	3.5E+02	2.9E+04	--	--	3.5E+02	2.9E+04	--	--	--	--	--	--	--	--	**--**	**--**	**3.5E+02**	**2.9E+04**
2-Chloronaphthalene	0	--	--	1.7E+03	4.3E+03	--	--	4.6E+06	1.2E+07	--	--	--	--	--	--	--	--	**--**	**--**	**4.6E+06**	**1.2E+07**
2-Chlorophenol	0	--	--	1.2E+02	4.0E+02	--	--	3.2E+05	1.1E+06	--	--	--	--	--	--	--	--	**--**	**--**	**3.2E+05**	**1.1E+06**
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	9.6E-02	4.3E-01	--	--	--	--	--	--	--	--	--	--	**9.6E-02**	**4.3E-01**	**--**	**--**
Chromium III	0	8.2E+02	9.7E+01	--	--	9.5E+02	1.0E+03	--	--	--	--	--	--	--	--	--	--	**9.5E+02**	**1.0E+03**	**--**	**--**
Chromium VI	0	1.6E+01	1.1E+01	--	--	1.8E+01	1.2E+02	--	--	--	--	--	--	--	--	--	--	**1.8E+01**	**1.2E+02**	**--**	**--**
Chromium, Total	0	--	--	1.0E+02	--	--	--	2.7E+05	--	--	--	--	--	--	--	--	--	**--**	**--**	**2.7E+05**	**--**
Chrysene [C]	0	--	--	4.4E-02	4.9E-01	--	--	4.4E-02	4.9E-01	--	--	--	--	--	--	--	--	**--**	**--**	**4.4E-02**	**4.9E-01**
Copper	0	2.1E+01	1.2E+01	1.3E+03	--	2.4E+01	1.3E+02	3.5E+06	--	--	--	--	--	--	--	--	--	**2.4E+01**	**1.3E+02**	**3.5E+06**	**--**
Cyanide	0	2.2E+01	5.2E+00	7.0E+02	2.2E+05	2.5E+01	5.5E+01	1.9E+06	5.8E+08	--	--	--	--	--	--	--	--	**2.5E+01**	**5.5E+01**	**1.9E+06**	**5.8E+08**
DDD [C]	0	--	--	8.3E-03	8.4E-03	--	--	8.3E-03	8.4E-03	--	--	--	--	--	--	--	--	**--**	**--**	**8.3E-03**	**8.4E-03**
DDE [C]	0	--	--	5.9E-03	5.9E-03	--	--	5.9E-03	5.9E-03	--	--	--	--	--	--	--	--	**--**	**--**	**5.9E-03**	**5.9E-03**
DDT [C]	0	1.1E+00	1.0E-03	5.9E-03	5.9E-03	1.3E+00	1.1E-02	5.9E-03	5.9E-03	--	--	--	--	--	--	--	--	**1.3E+00**	**1.1E-02**	**5.9E-03**	**5.9E-03**
Demeton	0	--	1.0E-01	--	--	--	1.1E+00	--	--	--	--	--	--	--	--	--	--	**--**	**1.1E+00**	**--**	**--**
Dibenz(a,h)anthracene [C]	0	--	--	4.4E-02	4.9E-01	--	--	4.4E-02	4.9E-01	--	--	--	--	--	--	--	--	**--**	**--**	**4.4E-02**	**4.9E-01**
Dibutyl phthalate	0	--	--	2.7E+03	1.2E+04	--	--	7.3E+06	3.2E+07	--	--	--	--	--	--	--	--	**--**	**--**	**7.3E+06**	**3.2E+07**
Dichloromethane (Methylene Chloride) [C]	0	--	--	4.7E+01	1.6E+04	--	--	4.7E+01	1.6E+04	--	--	--	--	--	--	--	--	**--**	**--**	**4.7E+01**	**1.6E+04**
1,2-Dichlorobenzene	0	--	--	2.7E+03	1.7E+04	--	--	7.3E+06	4.6E+07	--	--	--	--	--	--	--	--	**--**	**--**	**7.3E+06**	**4.6E+07**
1,3-Dichlorobenzene	0	--	--	4.0E+02	2.6E+03	--	--	1.1E+06	7.0E+06	--	--	--	--	--	--	--	--	**--**	**--**	**1.1E+06**	**7.0E+06**
1,4-Dichlorobenzene	0	--	--	4.0E+02	2.6E+03	--	--	1.1E+06	7.0E+06	--	--	--	--	--	--	--	--	**--**	**--**	**1.1E+06**	**7.0E+06**
3,3-Dichlorobenzidine[C]	0	--	--	4.0E-01	7.7E-01	--	--	4.0E-01	7.7E-01	--	--	--	--	--	--	--	--	**--**	**--**	**4.0E-01**	**7.7E-01**
Dichlorobromomethane [C]	0	--	--	5.6E+00	4.6E+02	--	--	5.6E+00	4.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**5.6E+00**	**4.6E+02**
1,2-Dichloroethane [C]	0	--	--	3.8E+00	9.9E+02	--	--	3.8E+00	9.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**3.8E+00**	**9.9E+02**
1,1-Dichloroethylene	0	--	--	3.1E+02	1.7E+04	--	--	8.4E+05	4.6E+07	--	--	--	--	--	--	--	--	**--**	**--**	**8.4E+05**	**4.6E+07**
1,2-trans-dichloroethylene	0	--	--	7.0E+02	1.4E+05	--	--	1.9E+06	3.8E+08	--	--	--	--	--	--	--	--	**--**	**--**	**1.9E+06**	**3.8E+08**
2,4-Dichlorophenol	0	--	--	9.3E+01	7.9E+02	--	--	2.5E+05	2.1E+06	--	--	--	--	--	--	--	--	**--**	**--**	**2.5E+05**	**2.1E+06**
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	1.0E+02	--	--	--	2.7E+05	--	--	--	--	--	--	--	--	--	**--**	**--**	**2.7E+05**	**--**
1,2-Dichloropropane[C]	0	--	--	5.2E+00	3.9E+02	--	--	5.2E+00	3.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**5.2E+00**	**3.9E+02**
1,3-Dichloropropene	0	--	--	1.0E+01	1.7E+03	--	--	2.7E+04	4.6E+06	--	--	--	--	--	--	--	--	**--**	**--**	**2.7E+04**	**4.6E+06**
Dieldrin [C]	0	2.4E-01	5.6E-02	1.4E-03	1.4E-03	2.8E-01	5.9E-01	1.4E-03	1.4E-03	--	--	--	--	--	--	--	--	**2.8E-01**	**5.9E-01**	**1.4E-03**	**1.4E-03**
Diethyl Phthalate	0	--	--	2.3E+04	1.2E+05	--	--	6.2E+07	3.2E+08	--	--	--	--	--	--	--	--	**--**	**--**	**6.2E+07**	**3.2E+08**
Di-2-Ethylhexyl Phthalate [C]	0	--	--	1.8E+01	5.9E+01	--	--	1.8E+01	5.9E+01	--	--	--	--	--	--	--	--	**--**	**--**	**1.8E+01**	**5.9E+01**
2,4-Dimethylphenol	0	--	--	5.4E+02	2.3E+03	--	--	1.5E+06	6.2E+06	--	--	--	--	--	--	--	--	**--**	**--**	**1.5E+06**	**6.2E+06**
Dimethyl Phthalate	0	--	--	3.1E+05	2.9E+06	--	--	8.5E+08	7.9E+09	--	--	--	--	--	--	--	--	**--**	**--**	**8.5E+08**	**7.9E+09**
Di-n-Butyl Phthalate	0	--	--	2.7E+03	1.2E+04	--	--	7.3E+06	3.2E+07	--	--	--	--	--	--	--	--	**--**	**--**	**7.3E+06**	**3.2E+07**
2,4 Dinitrophenol	0	--	--	7.0E+01	1.4E+04	--	--	1.9E+05	3.8E+07	--	--	--	--	--	--	--	--	**--**	**--**	**1.9E+05**	**3.8E+07**
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	7.65E+02	--	--	3.6E+04	2.1E+06	--	--	--	--	--	--	--	--	**--**	**--**	**3.6E+04**	**2.1E+06**
2,4-Dinitrotoluene [C]	0	--	--	1.1E+00	9.1E+01	--	--	1.1E+00	9.1E+01	--	--	--	--	--	--	--	--	**--**	**--**	**1.1E+00**	**9.1E+01**
Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin) (ppq)	0	--	--	1.2E-06	1.2E-06	--	--	7.4E-04	7.4E-04	--	--	--	--	--	--	--	--	**--**	**--**	**7.4E-04**	**7.4E-04**
1,2-Diphenylhydrazine[C]	0	--	--	4.0E-01	5.4E+00	--	--	4.0E-01	5.4E+00	--	--	--	--	--	--	--	--	**--**	**--**	**4.0E-01**	**5.4E+00**
Alpha-Endosulfan	0	2.2E-01	5.6E-02	1.1E+02	2.4E+02	2.5E-01	5.9E-01	3.0E+05	6.5E+05	--	--	--	--	--	--	--	--	**2.5E-01**	**5.9E-01**	**3.0E+05**	**6.5E+05**
Beta-Endosulfan	0	2.2E-01	5.6E-02	1.1E+02	2.4E+02	2.5E-01	5.9E-01	3.0E+05	6.5E+05	--	--	--	--	--	--	--	--	**2.5E-01**	**5.9E-01**	**3.0E+05**	**6.5E+05**
Endosulfan Sulfate	0	--	--	1.1E+02	2.4E+02	--	--	3.0E+05	6.5E+05	--	--	--	--	--	--	--	--	**--**	**--**	**3.0E+05**	**6.5E+05**
Endrin	0	8.6E-02	3.6E-02	7.6E-01	8.1E-01	9.9E-02	3.8E-01	2.1E+03	2.2E+03	--	--	--	--	--	--	--	--	**9.9E-02**	**3.8E-01**	**2.1E+03**	**2.2E+03**
Endrin Aldehyde	0	--	--	7.6E-01	8.1E-01	--	--	2.1E+03	2.2E+03	--	--	--	--	--	--	--	--	**--**	**--**	**2.1E+03**	**2.2E+03**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Ethylbenzene	0	--	--	3.1E+03	2.9E+04	--	--	8.4E+06	7.9E+07	--	--	--	--	--	--	--	--	**--**	**--**	**8.4E+06**	**7.9E+07**
Fluoranthene	0	--	--	3.0E+02	3.7E+02	--	--	8.1E+05	1.0E+06	--	--	--	--	--	--	--	--	**--**	**--**	**8.1E+05**	**1.0E+06**
Fluorene	0	--	--	1.3E+03	1.4E+04	--	--	3.5E+06	3.8E+07	--	--	--	--	--	--	--	--	**--**	**--**	**3.5E+06**	**3.8E+07**
Foaming Agents	0	--	--	5.0E+02	--	--	--	1.4E+06	--	--	--	--	--	--	--	--	--	**--**	**--**	**1.4E+06**	**--**
Guthion	0	--	1.0E-02	--	--	--	1.1E-01	--	--	--	--	--	--	--	--	--	--	**--**	**1.1E-01**	**--**	**--**
Heptachlor [C]	0	5.2E-01	3.8E-03	2.1E-03	2.1E-03	6.0E-01	4.0E-02	2.1E-03	2.1E-03	--	--	--	--	--	--	--	--	**6.0E-01**	**4.0E-02**	**2.1E-03**	**2.1E-03**
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	1.0E-03	1.1E-03	6.0E-01	4.0E-02	1.0E-03	1.1E-03	--	--	--	--	--	--	--	--	**6.0E-01**	**4.0E-02**	**1.0E-03**	**1.1E-03**
Hexachlorobenzene[C]	0	--	--	7.5E-03	7.7E-03	--	--	7.5E-03	7.7E-03	--	--	--	--	--	--	--	--	**--**	**--**	**7.5E-03**	**7.7E-03**
Hexachlorobutadiene[C]	0	--	--	4.4E+00	5.0E+02	--	--	4.4E+00	5.0E+02	--	--	--	--	--	--	--	--	**--**	**--**	**4.4E+00**	**5.0E+02**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	3.9E-02	1.3E-01	--	--	3.9E-02	1.3E-01	--	--	--	--	--	--	--	--	**--**	**--**	**3.9E-02**	**1.3E-01**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	1.4E-01	4.6E-01	--	--	1.4E-01	4.6E-01	--	--	--	--	--	--	--	--	**--**	**--**	**1.4E-01**	**4.6E-01**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	--	1.9E-01	6.3E-01	1.1E+00	--	1.9E-01	6.3E-01	--	--	--	--	--	--	--	--	**1.1E+00**	**--**	**1.9E-01**	**6.3E-01**
Hexachlorocyclopentadiene	0	--	--	2.4E+02	1.7E+04	--	--	6.5E+05	4.6E+07	--	--	--	--	--	--	--	--	**--**	**--**	**6.5E+05**	**4.6E+07**
Hexachloroethane[C]	0	--	--	1.9E+01	8.9E+01	--	--	1.9E+01	8.9E+01	--	--	--	--	--	--	--	--	**--**	**--**	**1.9E+01**	**8.9E+01**
Hydrogen Sulfide	0	--	2.0E+00	--	--	--	2.1E+01	--	--	--	--	--	--	--	--	--	--	**--**	**2.1E+01**	**--**	**--**
Indeno (1,2,3-cd) pyrene [C]	0	--	--	4.4E-02	4.9E-01	--	--	4.4E-02	4.9E-01	--	--	--	--	--	--	--	--	**--**	**--**	**4.4E-02**	**4.9E-01**
Iron	0	--	--	3.0E+02	--	--	--	8.1E+05	--	--	--	--	--	--	--	--	--	**--**	**--**	**8.1E+05**	**--**
Isophorone[C]	0	--	--	3.6E+02	2.6E+04	--	--	3.6E+02	2.6E+04	--	--	--	--	--	--	--	--	**--**	**--**	**3.6E+02**	**2.6E+04**
Kepone	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**--**	**--**
Lead	0	2.1E+02	2.1E+01	1.5E+01	--	2.4E+02	2.2E+02	4.1E+04	--	--	--	--	--	--	--	--	--	**2.4E+02**	**2.2E+02**	**4.1E+04**	**--**
Malathion	0	--	1.0E-01	--	--	--	1.1E+00	--	--	--	--	--	--	--	--	--	--	**--**	**1.1E+00**	**--**	**--**
Manganese	0	--	--	5.0E+01	--	--	--	1.4E+05	--	--	--	--	--	--	--	--	--	**--**	**--**	**1.4E+05**	**--**
Mercury	0	1.4E+00	7.7E-01	5.0E-02	5.1E-02	1.6E+00	8.1E+00	1.4E+02	1.4E+02	--	--	--	--	--	--	--	--	**1.6E+00**	**8.1E+00**	**1.4E+02**	**1.4E+02**
Methyl Bromide	0	--	--	4.8E+01	4.0E+03	--	--	1.3E+05	1.1E+07	--	--	--	--	--	--	--	--	**--**	**--**	**1.3E+05**	**1.1E+07**
Methoxychlor	0	--	3.0E-02	1.0E+02	--	--	3.2E-01	2.7E+05	--	--	--	--	--	--	--	--	--	**--**	**3.2E-01**	**2.7E+05**	**--**
Mirex	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**--**	**--**
Monochlorobenzene	0	--	--	6.8E+02	2.1E+04	--	--	1.8E+06	5.7E+07	--	--	--	--	--	--	--	--	**--**	**--**	**1.8E+06**	**5.7E+07**
Nickel	0	2.7E+02	2.7E+01	6.1E+02	4.6E+03	3.1E+02	2.8E+02	1.7E+06	1.2E+07	--	--	--	--	--	--	--	--	**3.1E+02**	**2.8E+02**	**1.7E+06**	**1.2E+07**
Nitrate (as N)	0	--	--	1.0E+04	--	--	--	2.7E+07	--	--	--	--	--	--	--	--	--	**--**	**--**	**2.7E+07**	**--**
Nitrobenzene	0	--	--	1.7E+01	1.9E+03	--	--	4.6E+04	5.1E+06	--	--	--	--	--	--	--	--	**--**	**--**	**4.6E+04**	**5.1E+06**
N-Nitrosodimethylamine[C]	0	--	--	6.9E-03	8.1E+01	--	--	6.9E-03	8.1E+01	--	--	--	--	--	--	--	--	**--**	**--**	**6.9E-03**	**8.1E+01**
N-Nitrosodiphenylamine[C]	0	--	--	5.0E+01	1.6E+02	--	--	5.0E+01	1.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**5.0E+01**	**1.6E+02**
N-Nitrosodi-n-propylamine[C]	0	--	--	5.0E-02	1.4E+01	--	--	5.0E-02	1.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**5.0E-02**	**1.4E+01**
Parathion	0	6.5E-02	1.3E-02	--	--	7.5E-02	1.4E-01	--	--	--	--	--	--	--	--	--	--	**7.5E-02**	**1.4E-01**	**--**	**--**
PCB-1016	0	--	1.4E-02	--	--	--	1.5E-01	--	--	--	--	--	--	--	--	--	--	**--**	**1.5E-01**	**--**	**--**
PCB-1221	0	--	1.4E-02	--	--	--	1.5E-01	--	--	--	--	--	--	--	--	--	--	**--**	**1.5E-01**	**--**	**--**
PCB-1232	0	--	1.4E-02	--	--	--	1.5E-01	--	--	--	--	--	--	--	--	--	--	**--**	**1.5E-01**	**--**	**--**
PCB-1242	0	--	1.4E-02	--	--	--	1.5E-01	--	--	--	--	--	--	--	--	--	--	**--**	**1.5E-01**	**--**	**--**
PCB-1248	0	--	1.4E-02	--	--	--	1.5E-01	--	--	--	--	--	--	--	--	--	--	**--**	**1.5E-01**	**--**	**--**
PCB-1254	0	--	1.4E-02	--	--	--	1.5E-01	--	--	--	--	--	--	--	--	--	--	**--**	**1.5E-01**	**--**	**--**
PCB-1260	0	--	1.4E-02	--	--	--	1.5E-01	--	--	--	--	--	--	--	--	--	--	**--**	**1.5E-01**	**--**	**--**
PCB Total[C]	0	--	--	1.7E-03	1.7E-03	--	--	1.7E-03	1.7E-03	--	--	--	--	--	--	--	--	**--**	**--**	**1.7E-03**	**1.7E-03**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Pentachlorophenol [C]	0	7.7E-03	5.9E-03	2.8E+00	8.2E+01	8.9E-03	6.2E-02	2.8E+00	8.2E+01	--	--	--	--	--	--	--	--	**8.9E-03**	**6.2E-02**	**2.8E+00**	**8.2E+01**
Phenol	0	--	--	2.1E+04	4.6E+06	--	--	5.7E+07	1.2E+10	--	--	--	--	--	--	--	--	**--**	**--**	**5.7E+07**	**1.2E+10**
Pyrene	0	--	--	9.6E+02	1.1E+04	--	--	2.6E+06	3.0E+07	--	--	--	--	--	--	--	--	**--**	**--**	**2.6E+06**	**3.0E+07**
Radionuclides (pCi/l except Beta/Photon)	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**--**	**--**	**--**	**--**
Gross Alpha Activity	0	--	--	1.5E+01	1.5E+01	--	--	4.1E+04	4.1E+04	--	--	--	--	--	--	--	--	**--**	**--**	**4.1E+04**	**4.1E+04**
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	4.0E+00	--	--	1.1E+04	1.1E+04	--	--	--	--	--	--	--	--	**--**	**--**	**1.1E+04**	**1.1E+04**
Strontium-90	0	--	--	8.0E+00	8.0E+00	--	--	2.2E+04	2.2E+04	--	--	--	--	--	--	--	--	**--**	**--**	**2.2E+04**	**2.2E+04**
Tritium	0	--	--	2.0E+04	2.0E+04	--	--	5.4E+07	5.4E+07	--	--	--	--	--	--	--	--	**--**	**--**	**5.4E+07**	**5.4E+07**
Selenium	0	2.0E+01	5.0E+00	1.7E+02	1.1E+04	2.3E+01	5.3E+01	4.6E+05	3.0E+07	--	--	--	--	--	--	--	--	**2.3E+01**	**5.3E+01**	**4.6E+05**	**3.0E+07**
Silver	0	7.5E+00	--	--	--	8.6E+00	--	--	--	--	--	--	--	--	--	--	--	**8.6E+00**	**--**	**--**	**--**
Sulfate	0	--	--	2.5E+05	--	--	--	6.8E+08	--	--	--	--	--	--	--	--	--	**--**	**--**	**6.8E+08**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	1.7E+00	1.1E+02	--	--	1.7E+00	1.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**1.7E+00**	**1.1E+02**
Tetrachloroethylene[C]	0	--	--	8.0E+00	8.9E+01	--	--	8.0E+00	8.9E+01	--	--	--	--	--	--	--	--	**--**	**--**	**8.0E+00**	**8.9E+01**
Thallium	0	--	--	1.7E+00	6.3E+00	--	--	4.6E+03	1.7E+04	--	--	--	--	--	--	--	--	**--**	**--**	**4.6E+03**	**1.7E+04**
Toluene	0	--	--	6.8E+03	2.0E+05	--	--	1.8E+07	5.4E+08	--	--	--	--	--	--	--	--	**--**	**--**	**1.8E+07**	**5.4E+08**
Total dissolved solids	0	--	--	5.0E+05	--	--	--	1.4E+09	--	--	--	--	--	--	--	--	--	**--**	**--**	**1.4E+09**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	7.3E-03	7.5E-03	8.4E-01	2.1E-03	7.3E-03	7.5E-03	--	--	--	--	--	--	--	--	**8.4E-01**	**2.1E-03**	**7.3E-03**	**7.5E-03**
Tributyltin	0	4.6E-01	6.3E-02	--	--	5.3E-01	6.6E-01	--	--	--	--	--	--	--	--	--	--	**5.3E-01**	**6.6E-01**	**--**	**--**
1,2,4-Trichlorobenzene	0	--	--	2.6E+02	9.4E+02	--	--	7.0E+05	2.5E+06	--	--	--	--	--	--	--	--	**--**	**--**	**7.0E+05**	**2.5E+06**
1,1,2-Trichloroethane[C]	0	--	--	6.0E+00	4.2E+02	--	--	6.0E+00	4.2E+02	--	--	--	--	--	--	--	--	**--**	**--**	**6.0E+00**	**4.2E+02**
Trichloroethylene [C]	0	--	--	2.7E+01	8.1E+02	--	--	2.7E+01	8.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**2.7E+01**	**8.1E+02**
2,4,6-Trichlorophenol [C]	0	--	--	2.1E+01	6.5E+01	--	--	2.1E+01	6.5E+01	--	--	--	--	--	--	--	--	**--**	**--**	**2.1E+01**	**6.5E+01**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	5.0E+01	--	--	--	1.4E+05	--	--	--	--	--	--	--	--	--	**--**	**--**	**1.4E+05**	**--**
Vinyl Chloride[C]	0	--	--	2.3E-01	6.1E+01	--	--	2.3E-01	6.1E+01	--	--	--	--	--	--	--	--	**--**	**--**	**2.3E-01**	**6.1E+01**
Zinc	0	1.7E+02	1.6E+02	9.1E+03	6.9E+04	2.0E+02	1.6E+03	2.5E+07	1.9E+08	--	--	--	--	--	--	--	--	**2.0E+02**	**1.6E+03**	**2.5E+07**	**1.9E+08**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens, Harmonic Mean for Carcinogens, and Annual Average for Dioxin. Mixing ratios may be substituted for stream flows where appropriate.

Metal	Target Value (SSTV)
Antimony	3.8E+04
Arsenic	1.6E+02
Barium	5.4E+06
Cadmium	3.0E+00
Chromium III	3.8E+02
Chromium VI	7.4E+00
Copper	9.5E+00
Iron	8.1E+05
Lead	9.7E+01
Manganese	1.4E+05
Mercury	6.5E-01
Nickel	1.2E+02
Selenium	9.2E+00
Silver	3.5E+00
Zinc	7.9E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

7/17/2008 11:22:20 AM

Facility = Leesburg WPCF @ 7.5 MGD
Chemical = Chlorine
Chronic averaging period = 4
WLAa = 0.023
WLAc = 0.15
Q.L. = .1
# samples/mo. = 30
# samples/wk. = 8

Summary of Statistics:

observations = 1
Expected Value = .2
Variance = .0144
C.V. = 0.6
97th percentile daily values = .486683
97th percentile 4 day average = .332758
97th percentile 30 day average= .241210
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 0.023
Average Weekly limit = 1.37196169757511E-02
Average Monthly LImit = 1.13992867689566E-02

The data are:

0.2

7/17/2008 11:22:48 AM

Facility = Leesburg WPCF @ 10 MGD
Chemical = Chlorine
Chronic averaging period = 4
WLAa = 0.022
WLAc = 0.12
Q.L. = .1
# samples/mo. = 30
# samples/wk. = 8

Summary of Statistics:

observations = 1
Expected Value = .2
Variance = .0144
C.V. = 0.6
97th percentile daily values = .486683
97th percentile 4 day average = .332758
97th percentile 30 day average= .241210
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 0.022
Average Weekly limit = 1.31231118898489E-02
Average Monthly LImit = 1.09036656050889E-02

The data are:

0.2

ENVIRONMENTAL SYSTEMS SERVICE, LTD.

Page: 1

Work Order #: 80784
Contract #:
Customer #: 3373
Customer PO #:

LEESBURG, TOWN OF
ATTN: JAY ANDERSON
P. O. BOX 88
LEESBURG, VA 22075

Job Location: TOWN OF LEESBURG
Collected by: CLIENT
Date Received: 04/17/2008

ANALYSIS REPORT

COMMENT: ANALYSES PERFORMED BY CHEMICAL SOLUTIONS, LTD.

TAG #: 12258 SAMPLE POINT: FINAL (4/09/08) SAMPLE DATE: 04/10/2008

Description	Result	Unit	Rpt. Limit	Method	Anlys Date	Time	Init
Copper, Total Recoverable	0.009	mg/l	0.005	EPA 200.8	04/25/08		SB

TAG #: 12259 SAMPLE POINT: FINAL (4/13/08) SAMPLE DATE: 04/14/2008

Description	Result	Unit	Rpt. Limit	Method	Anlys Date	Time	Init
Copper, Total Recoverable	0.010	mg/l	0.005	EPA 200.8	04/25/08		SB

TAG #: 12260 SAMPLE POINT: FINAL (4/15/08) SAMPLE DATE: 04/16/2008

Description	Result	Unit	Rpt. Limit	Method	Anlys Date	Time	Init
Copper, Total Recoverable	0.010	mg/l	0.005	EPA 200.8	04/25/08		SB

Reviewed by: _____
ESS LAB SERVICES

Report Date: April 30, 2008
VA LAB ID# 00115

7/17/2008 11:29:49 AM

Facility = Leesburg WPCF @ 7.5 MGD
Chemical = Copper
Chronic averaging period = 4
WLAa = 25
WLAc = 160
Q.L. = 5
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 3
Expected Value = 9.66666
Variance = 33.64
C.V. = 0.6
97th percentile daily values = 23.5230
97th percentile 4 day average = 16.0833
97th percentile 30 day average= 11.6585
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

10
10
9

7/17/2008 11:29:32 AM

Facility = Leesburg WPCF @ 10 MGD
Chemical = Copper
Chronic averaging period = 4
WLAa = 24
WLAc = 130
Q.L. = 5
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 3
Expected Value = 9.66666
Variance = 33.64
C.V. = 0.6
97th percentile daily values = 23.5230
97th percentile 4 day average = 16.0833
97th percentile 30 day average= 11.6585
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

10
10
9

7/17/2008 11:30:20 AM

Facility = Leesburg WPCF @ 7.5 MGD
Chemical = Nickel
Chronic averaging period = 4
WLAa = 320
WLAc = 360
Q.L. = 1.7
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 2.8
Variance = 2.8224
C.V. = 0.6
97th percentile daily values = 6.81356
97th percentile 4 day average = 4.65861
97th percentile 30 day average= 3.37694
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

2.8

7/17/2008 11:30:40 AM

Facility = Leesburg WPCF @ 10 MGD
Chemical = Nickel
Chronic averaging period = 4
WLAa = 310
WLAc = 280
Q.L. = 1.7
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 2.8
Variance = 2.8224
C.V. = 0.6
97th percentile daily values = 6.81356
97th percentile 4 day average = 4.65861
97th percentile 30 day average= 3.37694
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

2.8

7/17/2008 11:31:12 AM

Facility = Leesburg WPCF @ 7.5 MGD
Chemical = Zinc
Chronic averaging period = 4
WLAa = 210
WLAc = 2100
Q.L. = 8.8
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 42.8
Variance = 659.462
C.V. = 0.6
97th percentile daily values = 104.150
97th percentile 4 day average = 71.2102
97th percentile 30 day average= 51.6190
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

42.8

7/17/2008 11:31:32 AM

Facility = Leesburg WPCF @ 10 MGD
Chemical = Zinc
Chronic averaging period = 4
WLAa = 200
WLAc = 1600
Q.L. = 8.8
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 42.8
Variance = 659.462
C.V. = 0.6
97th percentile daily values = 104.150
97th percentile 4 day average = 71.2102
97th percentile 30 day average= 51.6190
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

42.8

Spreadsheet for determination of WET test endpoints or WET limits

Excel 97
Revision Date: 01/10/05
File: WETLIM10.xls
(MIX.EXE required also)

Acute Endpoint/Permit Limit — **Use as LC_{50} in Special Condition, as TUa on DMR**

ACUTE	100% =	NOAEC	LC_{50} =	NA	% Use as	NA	TUa

ACUTE WLAa 3.582

Note: Inform the permittee that if the mean of the data exceeds this TUa: 1.0 a limit may result using WLA.EXE

Chronic Endpoint/Permit Limit — **Use as NOEC in Special Condition, as TUc on DMR**

CHRONIC	1.804934166	TU_c	NOEC =	56	% Use as	1.78	TU_c
BOTH*	35.82000088	TU_c	NOEC =	3	% Use as	33.33	TU_c
AML	1.804934166	TU_c	NOEC =	56	% Use as	1.78	TU_c

ACUTE WLAa,c 35.82
CHRONIC WLAc 1.23408
* Both means acute expressed as chronic

Note: Inform the permittee that if the mean of the data exceeds this TUc: 1.0 a limit may result using WLA.EXE

Enter data in the cells with blue type:

Entry Date:	05/27/08				
Facility Name:	Leesburg WPCF				
VPDES Number:	VA0092282				
Outfall Number:	1				
		% Flow to be used from MIX.EXE		**Difuser /modeling study?**	
Plant Flow:	7.5	MGD		Enter Y/N	N
Acute 1Q10:	547	MGD	15 %	Acute	1 :1
Chronic 7Q10:	627	MGD	0.28 %	Chronic	1 :1

Are data available to calculate CV? (Y/N) N (Minimum of 10 data points, same species, needed) Go to Page 2
Are data available to calculate ACR? (Y/N) N (NOEC<LC50, do not use greater/less than data) Go to Page 3

IWC_a	8.37520938	%	Plant flow/plant flow + 1Q10
IWC_c	81.03202386	%	Plant flow/plant flow + 7Q10
Dilution, acute	11.94		100/IWCa
Dilution, chronic	1.23408		100/IWCc
WLA_a	3.582		Instream criterion (0.3 TUa) X's Dilution, acute
WLA_c	1.23408		Instream criterion (1.0 TUc) X's Dilution, chronic
$WLA_{a,c}$	35.82		ACR X's WLA_a - converts acute WLA to chronic units
ACR -acute/chronic ratio	10		LC50/NOEC (Default is 10 - if data are available, use tables Page 3)
CV-Coefficient of variation	0.6		Default of 0.6 - if data are available, use tables Page 2)
Constants eA	0.4109447		Default = 0.41
eB	0.6010373		Default = 0.60
eC	2.4334175		Default = 2.43
eD	2.4334175		Default = 2.43 (1 samp)

NOTE: If the IWCa is >33%, specify the NOAEC = 100% test/endpoint for use

No. of samples: 1

**The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTAa,c and MDL using it are driven by the ACR.

$LTA_{a,c}$	14.72003915		WLAa,c X's eA						
LTA_c	0.741728111		WLAc X's eB					Rounded NOEC's	%
MDL** with $LTA_{a,c}$	35.82000088	TU_c	NOEC =	2.791736	(Protects from acute/chronic toxicity)			NOEC = 3	%
MDL** with LTA_c	1.804934166	TU_c	NOEC =	55.403683	(Protects from chronic toxicity)			NOEC = 56	%
AML with lowest LTA	1.804934166	TU_c	NOEC =	55.403683	Lowest LTA X's eD			NOEC = 56	

IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a

								Rounded LC50's	%
MDL with $LTA_{a,c}$	3.582000088	TU_a	LC50 =	27.917364	%			LC50 = 28	%
MDL with LTA_c	0.180493417	TU_a	LC50 =	554.036828	%	Use NOAEC=100%		LC50 = NA	

Page 2 - Follow the directions to develop a site specific CV (coefficient of variation)

IF YOU HAVE AT LEAST 10 DATA POINTS THAT ARE QUANTIFIABLE (NOT "<" OR ">") FOR A SPECIES, ENTER THE DATA IN EITHER COLUMN "G" (VERTEBRATE) OR COLUMN "J" (INVERTEBRATE). THE 'CV' WILL BE PICKED UP FOR THE CALCULATIONS BELOW. THE DEFAULT VALUES FOR eA, eB, AND eC WILL CHANGE IF THE 'CV' IS ANYTHING OTHER THAN 0.6.

Coefficient of Variation for effluent tests

CV = 0.6 (Default 0.6)

δ^2 = 0.3074847

δ = 0.554513029

Using the log variance to develop eA
(P. 100, step 2a of TSD)

Z = 1.881 (97% probability stat from table

A = -0.88929666

eA = 0.410944686

Using the log variance to develop eB
(P. 100, step 2b of TSD)

δ_4^2 = 0.086177696

δ_4 = 0.293560379

B = -0.50909823

eB = 0.601037335

Using the log variance to develop eC
(P. 100, step 4a of TSD)

δ^2 = 0.3074847

δ = 0.554513029

C = 0.889296658

eC = 2.433417525

Using the log variance to develop eD
(P. 100, step 4b of TSD)

n = 1 This number will most likely stay as "1", for 1 sample/month.

δ_n^2 = 0.3074847

δ_n = 0.554513029

D = 0.889296658

eD = 2.433417525

	Vertebrate IC_{25} Data or LC_{50} Data	LN of data		Invertebrate IC_{25} Data or LC_{50} Data	LN of data
	**********			**********	
1	0		1	0	
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		
13			13		
14			14		
15			15		
16			16		
17			17		
18			18		
19			19		
20			20		
St Dev	NEED DATA	NEED DATA	St Dev	NEED DATA	NEED DATA
Mean	0	0	Mean	0	0
Variance	0	0.000000	Variance	0	0.000000
CV	0		CV	0	

Page 3 - Follow directions to develop a site specific ACR (Acute to Chronic Ratio)

To determine Acute/Chronic Ratio (ACR), insert usable data below. Usable data is defined as valid paired test results, acute and chronic, tested at the same temperature, same species. The chronic NOEC must be less than the acute LC_{50}, since the ACR divides the LC_{50} by the NOEC. LC_{50}'s >100% should not be used.

Table 1. ACR using Vertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

Table 1. Result:	Vertebrate ACR		0
Table 2. Result:	Invertebrate ACR		0
	Lowest ACR		Default to 10

Table 2. ACR using Invertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

Convert LC_{50}'s and NOEC's to Chronic TU's for use in WLA.EXE

Table 3. ACR used: 10

	Enter LC_{50}	TUc	Enter NOEC	TUc
1		NO DATA		NO DATA
2		NO DATA		NO DATA
3		NO DATA		NO DATA
4		NO DATA		NO DATA
5		NO DATA		NO DATA
6		NO DATA		NO DATA
7		NO DATA		NO DATA
8		NO DATA		NO DATA
9		NO DATA		NO DATA
10		NO DATA		NO DATA
11		NO DATA		NO DATA
12		NO DATA		NO DATA
13		NO DATA		NO DATA
14		NO DATA		NO DATA
15		NO DATA		NO DATA
16		NO DATA		NO DATA
17		NO DATA		NO DATA
18		NO DATA		NO DATA
19		NO DATA		NO DATA
20		NO DATA		NO DATA

If WLA.EXE determines that an acute limit is needed, you need to convert the TUc answer you get to TUa and then an LC50,

enter it here: NO DATA %LC_{50}

NO DATA TUa

DILUTION SERIES TO RECOMMEND

Table 4.

	Monitoring		Limit	
	% Effluent	TUc	% Effluent	TUc
Dilution series based on data mean	100	1.0		
Dilution series to use for limit			56	1.7857143
Dilution factor to recommend:	0.5		0.7483315	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	50.0	2.00	74.8	1.34
	25.0	4.00	56.0	1.79
	12.5	8.00	41.9	2.39
	6.25	16.00	31.4	3.19
Extra dilutions if needed	3.12	32.05	23.5	4.26
	1.56	64.10	17.6	5.69

Cell: I9
Comment:
This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: K18
Comment: This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: J22
Comment: Remember to change the "N" to "Y" if you have ratios entered, otherwise, they won't be used in the calculations.

Cell: C40
Comment:
If you have entered data to calculate an ACR on page 3, and this is still defaulted to "10", make sure you have selected "Y" in cell E21

Cell: C41
Comment: If you have entered data to calculate an effluent specific CV on page 2, and this is still defaulted to "0.6", make sure you have selected "Y" in cell E20

Cell: L48
Comment:
See Row 151 for the appropriate dilution series to use for these NOEC's

Cell: G62
Comment:
Vertebrates are:
Pimephales promelas
Oncorhynchus mykiss
Cyprinodon variegatus

Cell: J62
Comment:
Invertebrates are:
Ceriodaphnia dubia
Mysidopsis bahia

Cell: C117
Comment: Vertebrates are:

Pimephales promelas
Cyprinodon variegatus

Cell: M119
Comment: The ACR has been picked up from cell C34 on Page 1. If you have paired data to calculate an ACR, enter it in the tables to the left, and make sure you have a "Y" in cell E21 on Page 1. Otherwise, the default of 10 will be used to convert your acute data.

Cell: M121
Comment: If you are only concerned with acute data, you can enter it in the NOEC column for conversion and the number calculated will be equivalent to the TUa. The calculation is the same: 100/NOEC = TUc or 100/LC50 = TUa.

Cell: C138
Comment: Invertebrates are:

Ceriodaphnia dubia
Mysidopsis bahia

Spreadsheet for determination of WET test endpoints or WET limits

Excel 97
Revision Date: 01/10/05
File: WETLIM10.xls
(MIX.EXE required also)

Enter data in the cells with blue type:

Entry Date:	05/27/08
Facility Name:	Leesburg WPCF
VPDES Number:	VA0092282
Outfall Number:	1

Acute Endpoint/Permit Limit — **Use as LC_{50} in Special Condition, as TUa on DMR**

ACUTE 100% = NOAEC LC_{50} = NA % Use as NA TUa

ACUTE WLAa 2.7615

Note: Inform the permittee that if the mean of the data exceeds this TUa: 1.0 a limit may result using WLA.EXE

Chronic Endpoint/Permit Limit — **Use as NOEC in Special Condition, as TUc on DMR**

CHRONIC	1.719344295	TU_c	NOEC =	59	% Use as	1.69	TU_c
BOTH*	27.61500068	TU_c	NOEC =	4	% Use as	25.00	TU_c
AML	1.719344295	TU_c	NOEC =	59	% Use as	1.69	TU_c

ACUTE WLAa,c 27.615
CHRONIC WLAc 1.17556
* Both means acute expressed as chronic

Note: Inform the permittee that if the mean of the data exceeds this TUc: 1.0 a limit may result using WLA.EXE

% Flow to be used from MIX.EXE

Plant Flow:	10 MGD		
Acute 1Q10:	547 MGD	15 %	
Chronic 7Q10:	627 MGD	0.28 %	

Difuser /modeling study?

Enter Y/N N
Acute 1 :1
Chronic 1 :1

Are data available to calculate CV? (Y/N) N (Minimum of 10 data points, same species, needed) Go to Page 2
Are data available to calculate ACR? (Y/N) N (NOEC<LC50, do not use greater/less than data) Go to Page 3

IWC_a	10.86366105 %	Plant flow/plant flow + 1Q10	
IWC_c	85.06584096 %	Plant flow/plant flow + 7Q10	
Dilution, acute	9.205	100/IWCa	
Dilution, chronic	1.17556	100/IWCc	
WLA_a	2.7615	Instream criterion (0.3 TUa) X's Dilution, acute	
WLA_c	1.17556	Instream criterion (1.0 TUc) X's Dilution, chronic	
$WLA_{a,c}$	27.615	ACR X's WLA_a - converts acute WLA to chronic units	
ACR -acute/chronic ratio	10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)	
CV-Coefficient of variation	0.6	Default of 0.6 - if data are available, use tables Page 2)	
Constants eA	0.4109447	Default = 0.41	
eB	0.6010373	Default = 0.60	
eC	2.4334175	Default = 2.43	
eD	2.4334175	Default = 2.43 (1 samp)	No. of samples: 1

NOTE: If the IWCa is >33%, specify the NOAEC = 100% test/endpoint for use

****The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTAa,c and MDL using it are driven by the ACR.**

$LTA_{a,c}$	11.34823789	WLAa,c X's eA						
LTA_c	0.706555408	WLAc X's eB					Rounded NOEC's	%
MDL** with $LTA_{a,c}$	27.61500068	TU_c	NOEC =	3.621220	(Protects from acute/chronic toxicity)		NOEC = 4	%
MDL** with LTA_c	1.719344295	TU_c	NOEC =	58.161707	(Protects from chronic toxicity)		NOEC = 59	%
AML with lowest LTA	1.719344295	TU_c	NOEC =	58.161707	Lowest LTA X's eD		NOEC = 59	

IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a

							Rounded LC50's	%
MDL with $LTA_{a,c}$	2.761500068	TU_a	LC50 =	36.212203	%		LC50 = 37	%
MDL with LTA_c	0.17193443	TU_a	LC50 =	581.617075	%	Use NOAEC=100%	LC50 = NA	

Page 2 - Follow the directions to develop a site specific CV (coefficient of variation)

IF YOU HAVE AT LEAST 10 DATA POINTS THAT ARE QUANTIFIABLE (NOT "<" OR ">") FOR A SPECIES, ENTER THE DATA IN EITHER COLUMN "G" (VERTEBRATE) OR COLUMN "J" (INVERTEBRATE). THE 'CV' WILL BE PICKED UP FOR THE CALCULATIONS BELOW. THE DEFAULT VALUES FOR eA, eB, AND eC WILL CHANGE IF THE 'CV' IS ANYTHING OTHER THAN 0.6.

Coefficient of Variation for effluent tests

CV = 0.6 (Default 0.6)

δ^2 = 0.3074847

δ = 0.554513029

Using the log variance to develop eA
(P. 100, step 2a of TSD)

Z = 1.881 (97% probability stat from table

A = -0.88929666

eA = 0.410944686

Using the log variance to develop eB
(P. 100, step 2b of TSD)

δ_4^2 = 0.086177696

δ_4 = 0.293560379

B = -0.50909823

eB = 0.601037335

Using the log variance to develop eC
(P. 100, step 4a of TSD)

δ^2 = 0.3074847

δ = 0.554513029

C = 0.889296658

eC = 2.433417525

Using the log variance to develop eD
(P. 100, step 4b of TSD)

n = 1 This number will most likely stay as "1", for 1 sample/month.

δ_n^2 = 0.3074847

δ_n = 0.554513029

D = 0.889296658

eD = 2.433417525

	Vertebrate IC_{25} Data or LC_{50} Data	LN of data		Invertebrate IC_{25} Data or LC_{50} Data	LN of data
	**********			**********	
1	0		1	0	
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		
13			13		
14			14		
15			15		
16			16		
17			17		
18			18		
19			19		
20			20		
St Dev	NEED DATA	NEED DATA	St Dev	NEED DATA	NEED DATA
Mean	0	0	Mean	0	0
Variance	0	0.000000	Variance	0	0.000000
CV	0		CV	0	

Page 3 - Follow directions to develop a site specific ACR (Acute to Chronic Ratio)

To determine Acute/Chronic Ratio (ACR), insert usable data below. Usable data is defined as valid paired test results, acute and chronic, tested at the same temperature, same species. The chronic NOEC must be less than the acute LC_{50}, since the ACR divides the LC_{50} by the NOEC. LC_{50}'s >100% should not be used.

Table 1. ACR using Vertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

Table 1. Result:	Vertebrate ACR	0
Table 2. Result:	Invertebrate ACR	0
	Lowest ACR	Default to 10

Table 2. ACR using Invertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

Table 3. Convert LC_{50}'s and NOEC's to Chronic TU's for use in WLA.EXE

ACR used: 10

	Enter LC_{50}	TUc	Enter NOEC	TUc
1		NO DATA		NO DATA
2		NO DATA		NO DATA
3		NO DATA		NO DATA
4		NO DATA		NO DATA
5		NO DATA		NO DATA
6		NO DATA		NO DATA
7		NO DATA		NO DATA
8		NO DATA		NO DATA
9		NO DATA		NO DATA
10		NO DATA		NO DATA
11		NO DATA		NO DATA
12		NO DATA		NO DATA
13		NO DATA		NO DATA
14		NO DATA		NO DATA
15		NO DATA		NO DATA
16		NO DATA		NO DATA
17		NO DATA		NO DATA
18		NO DATA		NO DATA
19		NO DATA		NO DATA
20		NO DATA		NO DATA

If WLA.EXE determines that an acute limit is needed, you need to convert the TUc answer you get to TUa and then an LC50,

enter it here: NO DATA %LC_{50}

NO DATA TUa

DILUTION SERIES TO RECOMMEND

Table 4.

	Monitoring		Limit	
	% Effluent	TUc	% Effluent	TUc
Dilution series based on data mean	100	1.0		
Dilution series to use for limit			59	1.6949153
Dilution factor to recommend:	0.5		0.7681146	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	50.0	2.00	76.8	1.30
	25.0	4.00	59.0	1.69
	12.5	8.00	45.3	2.21
	6.25	16.00	34.8	2.87
Extra dilutions if needed	3.12	32.05	26.7	3.74
	1.56	64.10	20.5	4.87

Cell: I9
Comment:
This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: K18
Comment: This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: J22
Comment: Remember to change the "N" to "Y" if you have ratios entered, otherwise, they won't be used in the calculations.

Cell: C40
Comment:
If you have entered data to calculate an ACR on page 3, and this is still defaulted to "10", make sure you have selected "Y" in cell E21

Cell: C41
Comment: If you have entered data to calculate an effluent specific CV on page 2, and this is still defaulted to "0.6", make sure you have selected "Y" in cell E20

Cell: L48
Comment:
See Row 151 for the appropriate dilution series to use for these NOEC's

Cell: G62
Comment:
Vertebrates are:
Pimephales promelas
Oncorhynchus mykiss
Cyprinodon variegatus

Cell: J62
Comment:
Invertebrates are:
Ceriodaphnia dubia
Mysidopsis bahia

Cell: C117
Comment: Vertebrates are:

Pimephales promelas
Cyprinodon variegatus

Cell: M119
Comment: The ACR has been picked up from cell C34 on Page 1. If you have paired data to calculate an ACR, enter it in the tables to the left, and make sure you have a "Y" in cell E21 on Page 1. Otherwise, the default of 10 will be used to convert your acute data.

Cell: M121
Comment: If you are only concerned with acute data, you can enter it in the NOEC column for conversion and the number calculated will be equivalent to the TUa. The calculation is the same: 100/NOEC = TUc or 100/LC50 = TUa.

Cell: C138
Comment: Invertebrates are:

Ceriodaphnia dubia
Mysidopsis bahia

Public Notice – Environmental Permit

PURPOSE OF NOTICE: To seek public comment on a draft permit from the Department of Environmental Quality that will allow the release of treated wastewater into a water body in Loudoun County Virginia.

PUBLIC COMMENT PERIOD: August 28, 2008 to 5:00 p.m. on September 26, 2008

PERMIT NAME: Virginia Pollutant Discharge Elimination System Permit – Wastewater issued by DEQ, under the authority of the State Water Control Board

APPLICANT NAME, ADDRESS AND PERMIT NUMBER: Town of Leesburg
25 West Market St., PO Box 88, Leesburg, VA 20178
VA0092282

NAME AND ADDRESS OF FACILITY: Leesburg Water Pollution Control Facility
1391 East Market Street, Leesburg, VA 20176

This facility is an Environmental Enterprise participant in Virginia's Environmental Excellence Program.

PROJECT DESCRIPTION: The Town of Leesburg has applied for a reissuance of a permit for the public Leesburg WPCF. The applicant proposes to release treated sewage wastewaters from residential areas at a rate of 7.5 Million Gallons per Day into a water body. The Class A Sludge from the treatment process will be sold or given away in a bag or other container for application to the land. The facility proposes to release the treated sewage in the Potomac River in Montgomery County, Maryland in the Potomac River watershed. A watershed is the land area drained by a river and its incoming streams. The permit will limit the following pollutants to amounts that protect water quality: pH, cBOD, TSS, DO, TKN, *E. coli*, Chlorine, Total Nitrogen and Total Phosphorus.

This facility is subject to the requirements of 9 VAC 25-820 and has registered for coverage under the General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Watershed in Virginia.

HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by e-mail, fax or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requestor, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. DEQ may hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit.

CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS AND ADDITIONAL INFORMATION: The public may review the documents at the DEQ-Northern Regional Office by appointment.
Name: Douglas Frasier
Address: DEQ-Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193
Phone: (703) 583-3873 E-mail: ddfrasier@deq.virginia.gov Fax: (703) 583-3841

Revised 2/2003

State "Transmittal Checklist" to Assist in Targeting
Municipal and Industrial Individual NPDES Draft Permits for Review

Part I. State Draft Permit Submission Checklist

In accordance with the MOA established between the Commonwealth of Virginia and the United States Environmental Protection Agency, Region III, the Commonwealth submits the following draft National Pollutant Discharge Elimination System (NPDES) permit for Agency review and concurrence.

Facility Name:	Leesburg WPCF
NPDES Permit Number:	VA0092282
Permit Writer Name:	Douglas Frasier
Date:	27 May 2008

Major [X] **Minor** [ ] **Industrial** [ ] **Municipal** [X]

I.A. Draft Permit Package Submittal Includes:	**Yes**	**No**	**N/A**
1. Permit Application?	X		
2. Complete Draft Permit (for renewal or first time permit – entire permit, including boilerplate information)?	X		
3. Copy of Public Notice?	X		
4. Complete Fact Sheet?	X		
5. A Priority Pollutant Screening to determine parameters of concern?	X		
6. A Reasonable Potential analysis showing calculated WQBELs?	X		
7. Dissolved Oxygen calculations?			X
8. Whole Effluent Toxicity Test summary and analysis?	X		
9. Permit Rating Sheet for new or modified industrial facilities?			X

I.B. Permit/Facility Characteristics	**Yes**	**No**	**N/A**
1. Is this a new, or currently unpermitted facility?		X	
2. Are all permissible outfalls (including combined sewer overflow points, non-process water and storm water) from the facility properly identified and authorized in the permit?	X		
3. Does the fact sheet **or** permit contain a description of the wastewater treatment process?	X		
4. Does the review of PCS/DMR data for at least the last 3 years indicate significant non-compliance with the existing permit?		X	
5. Has there been any change in streamflow characteristics since the last permit was developed?			X
6. Does the permit allow the discharge of new or increased loadings of any pollutants?		X	
7. Does the fact sheet **or** permit provide a description of the receiving water body(s) to which the facility discharges, including information on low/critical flow conditions and designated/existing uses?	X		
8. Does the facility discharge to a 303(d) listed water?	X		
a. Has a TMDL been developed and approved by EPA for the impaired water?		X	
b. Does the record indicate that the TMDL development is on the State priority list and will most likely be developed within the life of the permit?		X	
c. Does the facility discharge a pollutant of concern identified in the TMDL or 303(d) listed water?	X		
9. Have any limits been removed, or are any limits less stringent, than those in the current permit?		X	
10. Does the permit authorize discharges of storm water?		X	

I.B. Permit/Facility Characteristics – cont.	Yes	No	N/A
11. Has the facility substantially enlarged or altered its operation or substantially increased its flow or production?	X		
12. Are there any production-based, technology-based effluent limits in the permit?	X		
13. Do any water quality-based effluent limit calculations differ from the State's standard policies or procedures?		X	
14. Are any WQBELs based on an interpretation of narrative criteria?		X	
15. Does the permit incorporate any variances or other exceptions to the State's standards or regulations?		X	
16. Does the permit contain a compliance schedule for any limit or condition?		X	
17. Is there a potential impact to endangered/threatened species or their habitat by the facility's discharge(s)?	X		
18. Have impacts from the discharge(s) at downstream potable water supplies been evaluated?	X		
19. Is there any indication that there is significant public interest in the permit action proposed for this facility?		X	
20. Have previous permit, application, and fact sheet been examined?	X		

Part II. NPDES Draft Permit Checklist

Region III NPDES Permit Quality Checklist – for POTWs
(To be completed and included in the record only for POTWs)

II.A. Permit Cover Page/Administration	**Yes**	**No**	**N/A**
1. Does the fact sheet or permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?	X		
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?	X		

II.B. Effluent Limits – General Elements	**Yes**	**No**	**N/A**
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?	X		
2. Does the fact sheet discuss whether "antibacksliding" provisions were met for any limits that are less stringent than those in the previous NPDES permit?	X		

II.C. Technology-Based Effluent Limits (POTWs)	**Yes**	**No**	**N/A**
1. Does the permit contain numeric limits for ALL of the following: BOD (or alternative, e.g., CBOD, COD, TOC), TSS, and pH?	X		
2. Does the permit require at least 85% removal for BOD (or BOD alternative) and TSS (or 65% for equivalent to secondary) consistent with 40 CFR Part 133?	X		
a. If no, does the record indicate that application of WQBELs, or some other means, results in more stringent requirements than 85% removal or that an exception consistent with 40 CFR 133.103 has been approved?			X
3. Are technology-based permit limits expressed in the appropriate units of measure (e.g., concentration, mass, SU)?	X		
4. Are permit limits for BOD and TSS expressed in terms of both long term (e.g., average monthly) and short term (e.g., average weekly) limits?	X		
5. Are any concentration limitations in the permit less stringent than the secondary treatment requirements (30 mg/l BOD5 and TSS for a 30-day average and 45 mg/l BOD5 and TSS for a 7-day average)?		X	
a. If yes, does the record provide a justification (e.g., waste stabilization pond, trickling filter, etc.) for the alternate limitations?			X

II.D. Water Quality-Based Effluent Limits	**Yes**	**No**	**N/A**
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?	X		
2. Does the fact sheet indicate that any WQBELs were derived from a completed and EPA approved TMDL?			X
3. Does the fact sheet provide effluent characteristics for each outfall?	X		
4. Does the fact sheet document that a "reasonable potential" evaluation was performed?	X		
a. If yes, does the fact sheet indicate that the "reasonable potential" evaluation was performed in accordance with the State's approved procedures?	X		
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?	X		
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have "reasonable potential"?	X		
d. Does the fact sheet indicate that the "reasonable potential" and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations)?			X
e. Does the permit contain numeric effluent limits for all pollutants for which "reasonable potential" was determined?	X		

II.D. Water Quality-Based Effluent Limits – cont.	Yes	No	N/A
5. Are all final WQBELs in the permit consistent with the justification and/or documentation provided in the fact sheet?	X		
6. For all final WQBELs, are BOTH long-term AND short-term effluent limits established?	X		
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?	X		
8. Does the record indicate that an "antidegradation" review was performed in accordance with the State's approved antidegradation policy?	X		

II.E. Monitoring and Reporting Requirements	Yes	No	N/A
1. Does the permit require at least annual monitoring for all limited parameters and other monitoring as required by State and Federal regulations?	X		
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			
2. Does the permit identify the physical location where monitoring is to be performed for each outfall?	X		
3. Does the permit require at least annual influent monitoring for BOD (or BOD alternative) and TSS to assess compliance with applicable percent removal requirements?		X	
4. Does the permit require testing for Whole Effluent Toxicity?	X		

II.F. Special Conditions	Yes	No	N/A
1. Does the permit include appropriate biosolids use/disposal requirements?	X		
2. Does the permit include appropriate storm water program requirements?			X

II.F. Special Conditions – cont.	Yes	No	N/A
3. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?			X
4. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?			X
5. Does the permit allow/authorize discharge of sanitary sewage from points other than the POTW outfall(s) or CSO outfalls [i.e., Sanitary Sewer Overflows (SSOs) or treatment plant bypasses]?		X	
6. Does the permit authorize discharges from Combined Sewer Overflows (CSOs)?		X	
a. Does the permit require implementation of the "Nine Minimum Controls"?			X
b. Does the permit require development and implementation of a "Long Term Control Plan"?			X
c. Does the permit require monitoring and reporting for CSO events?			X
7. Does the permit include appropriate Pretreatment Program requirements?	X		

II.G. Standard Conditions	Yes	No	N/A
1. Does the **permit** contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?	X		

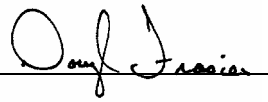
List of Standard Conditions – 40 CFR 122.41

Duty to comply	Property rights	Reporting Requirements
Duty to reapply	Duty to provide information	Planned change
Need to halt or reduce activity not a defense	Inspections and entry	Anticipated noncompliance
	Monitoring and records	Transfers
Duty to mitigate	Signatory requirement	Monitoring reports
Proper O & M	Bypass	Compliance schedules
Permit actions	Upset	24-Hour reporting
		Other non-compliance

2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for POTWs regarding notification of new introduction of pollutants and new industrial users [40 CFR 122.42(b)]?	X		

Part III. Signature Page

Based on a review of the data and other information submitted by the permit applicant, and the draft permit and other administrative records generated by the Department/Division and/or made available to the Department/Division, the information provided on this checklist is accurate and complete, to the best of my knowledge.

Name	Douglas Frasier
Title	Environmental Specialist II
Signature	
Date	27 May 2007